

# '68'

**\$2.50** USA

Australia  
Singapore

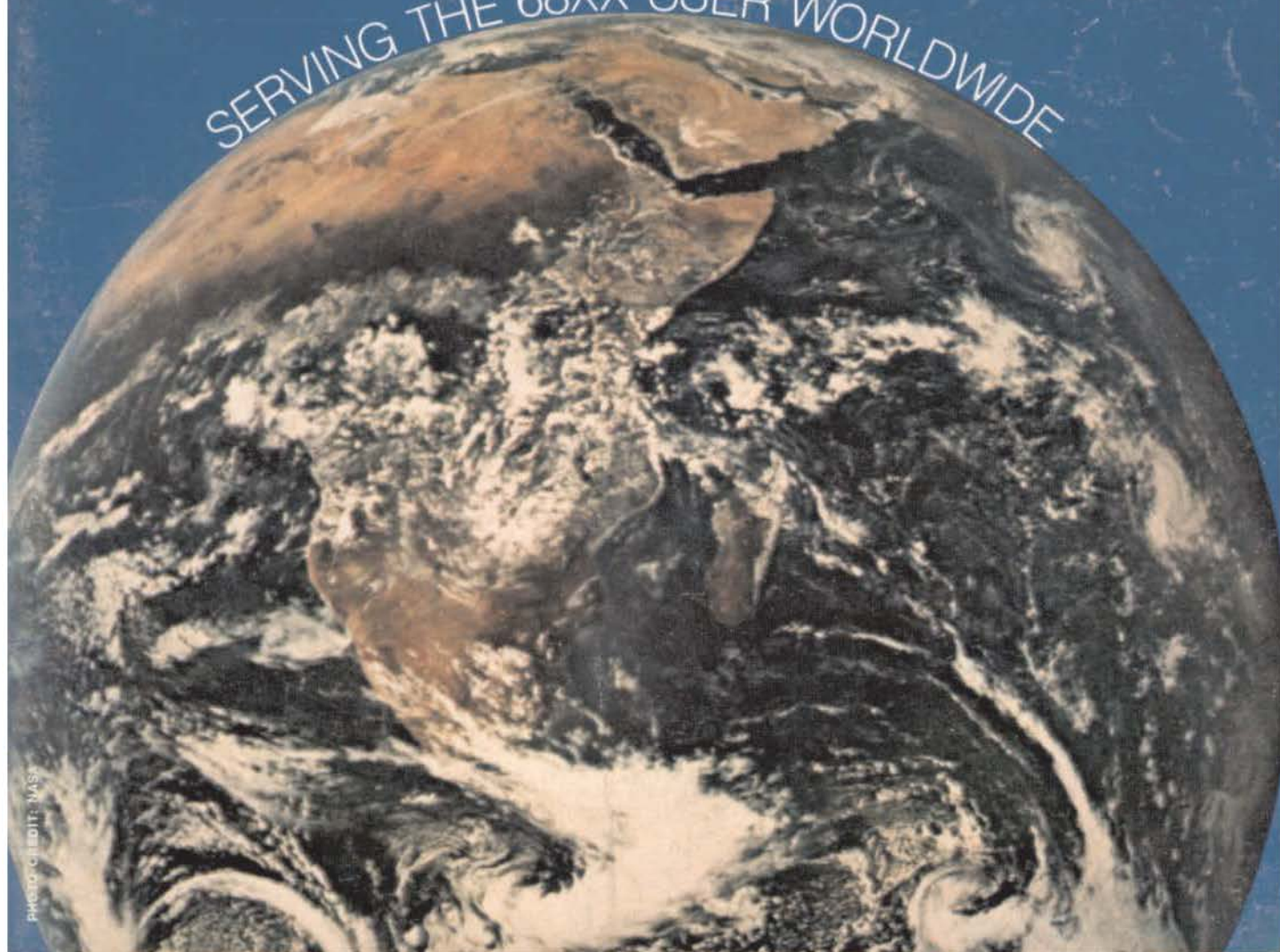
A \$ 4.00  
S \$ 8.00  
Malaysia

New Zealand NZ \$ 4.00  
Hong Kong H \$20.00  
M \$ 8.00

## MICRO JOURNAL

**VOLUME II ISSUE 9 • Devoted to the 68XX User • September 1980**  
"Small Computers Doing Big Things."

SERVING THE 68XX USER WORLDWIDE







## SYSTEMS - SOLUTIONS

If you have a problem that can be solved by a computer—we have a systems solution.

- Two central processors with maximum RAM capacities of 56K and 384 K bytes
- Three types of disk drives with capacities of 175K, 1.2M and 16M bytes
- Two dot matrix printers with 80 and 132 line capacity
- A Selectric typewriter interface and a daisy wheel printer

Match these to your exact need, add one or more of our intelligent terminals and put together a system from one source with guaranteed compatibility in both software and hardware.

Southwest Technical Products systems give you unmatched power, speed and versatility. They are packaged in custom designed woodgrain finished cabinets. Factory service and support on the entire system and local service is available in many cities.



**SOUTHWEST TECHNICAL PRODUCTS CORPORATION**  
 219 W. RHAPSODY  
 SAN ANTONIO, TEXAS 78216 (512) 344-0241



# UniFLEX<sup>TM</sup>



## Multi-User

UniFLEX is the first full capability multi-user operating system available for microprocessors. Designed for the 6809 and 68000, it offers its users a very friendly computing environment. After a user 'logs-in' with his user name and password, any of the system programs may be run at will. One user may run the text editor while another runs BASIC and still another runs the C compiler. Each user operates in his own system environment, unaware of other user activity. The total number of users is only restricted by the resources and efficiency of the hardware in use.



## Multi-Tasking

UniFLEX is a true multi-tasking operating system. Not only may several users run different programs, but one user may run several programs at a time. For example, a compilation of one file could be initiated while simultaneously making changes to another file using the text editor. New tasks are generated in the system by the 'fork' operation. Tasks may be run in the background or 'locked' in main memory to assist critical response times. Inter-task communication is also supported through the 'pipe' mechanism.



## Support

The design of UniFLEX, with its hierarchical file system and device independent I/O, allows the creation of a variety of complex support programs. There is currently a wide variety of software available and under development. Included in this list is a Text Processing System for word processing functions, BASIC interpreter and precompiler for general programming and educational use, native C and Pascal compilers for more advanced programming, sort/merge for business applications, and a variety of debug packages. The standard system includes a text editor, assembler, and about forty utility programs. UniFLEX for 6809 is sold with a single CPU license and one years maintenance for \$450.00. Additional yearly maintenance is available for \$100.00. OEM licenses are also available.

## FLEX<sup>TM</sup>

UniFLEX is offered for the advanced microprocessor systems. FLEX, the industry standard for 6800 and 6809 systems, is offered for smaller, single user systems. A full line of FLEX support software and OEM licenses are also available.



technical systems  
consultants, inc.

Box 2570, West Lafayette, IN 47906  
(317) 463-2502 Telex 276143

<sup>TM</sup>UniFLEX and FLEX are trademarks of Technical Systems Consultants, Inc.

# '68'

Portions of text prepared using the following.

SWTPC 6800-6809-DMAF2-CDS1-CT82-Sprint 3  
Southwest Technical Products  
219 W. Rhapsody  
San Antonio, Texas 78216

EDITOR - WORD PROCESSOR  
Technical Systems Consultants, Inc.  
Box 2573, W. Lafayette, IN 47906  
FLEX is TM of TSC

GIMIX Super Mainframe-Assorted memory boards  
GIMIX Inc.  
1337 West 37th Place  
Chicago, IL 60609

Publisher: Don Williams Sr.

Executive Editor: Larry Williams

Subscriptions and Office manager  
Mary Robertson

General Girl 'Friday'  
Joyce Williams

Contributing Editors:

Dr. Jack Bryant  
Dr. Chuck Adams  
Dr. Theo Elbert  
Dr. Jeffery Brownstein  
Dale Puckett  
Russell Gore  
Ron Anderson  
John Jordan

## \* CONTENTS \*

WARRANTIES.....	10 Editorial
UC-256 VIDEO GRAPHICS.....	10 Harmon
FLEX USERS NOTES.....	11 Anderson
SOFTWARE DYNAMICS COMPILER..	16 Jordan
BIT BUCKET.....	20 All of us
FIX ZERO SECTORS (FLEX).....	22 Hart
DS9-BASIC09.....	26 Harmon
TAPE and THE HOBBYIST.....	27 Libby
HELP.....	32
CLASSIFIED.....	32

# MICRO JOURNAL

## Send All Correspondence To:

'68' Micro Journal  
3018 Hamill Rd.  
PO Box 849  
Hixson, Tennessee 37343

— Phone —  
Office: 615-870-1993  
Plant: 615-892-7544  
Copyright © 1980

'68' Micro Journal is published 12 times a year by '68' Micro Journal, 6131 Airways Blvd., Chattanooga, TN 37421. Second Class postage paid at Chattanooga, TN. Postmaster: Send Form 3579 to '68' Micro Journal, PO Box 849, Hixson, TN 37343.

1-Year \$18.50 2-Year \$32.50 3-Year \$48.50

## —ITEMS SUBMITTED FOR PUBLICATION—

(Letters to the Editor for Publication) All 'letters to the Editor' should be substantiated by facts. Opinions should be indicated as such. All letters must be signed. We are interested in receiving letters that will benefit or alert our readers. Praise as well as gripes is always good subject matter. Your name may be withheld upon request. If you have had a good experience with a 6800 vendor please put it in a letter. If the experience was bad put that in a letter also. Remember, if you tell us who they are then it is only fair that your name 'not' be withheld. This means that all letters published, of a critical nature, cannot have a name withheld. We will attempt to publish 'verbatim' letters that are composed using 'good taste.' We reserve the right to define (for '68' Micro) what constitutes 'good taste.'

(Articles and items submitted for publication) Please, always include your full name, address, and telephone number. Date and number all sheets. TYPE them if you can, poorly handwritten copy is sometimes the difference between go, no-go. All items should be on 8X11 inch, white paper. Most all art work will be reproduced photographically, this includes all listings, diagrams and other non-text material. All typewritten copy should be done with a NEW RIBBON. All hand drawn art should be black on white paper. Please no hand written code items over 50 bytes. Neatly typed copy will be directly reproduced. Column width should be 3¼ inches.

(Advertising) Any Classified: Maximum 20 words. All single letters and/or numbers will be considered one (1) word. No Commercial or Business Type Classified advertising. Classified ads will be published in our standard format. Classified ads \$7.50 one time run, paid in advance.

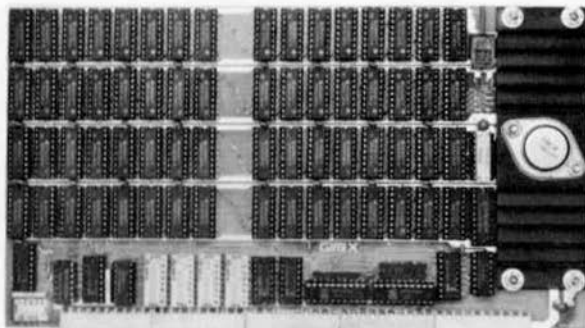
Commercial and/or Business advertisers please write or phone for current rate sheet and publication lag time.



## LOOK WHAT'S COOKING on the FIFTY BUS 32K STATIC RAM BOARDS

Designed for use with:

- ★ Existing SS50 Systems    ★ SS50C Extended Address Systems



- Assembled
- Burned In
- Tested

16K . . . \$328.12

24K . . . \$438.14

32K . . . \$548.15

16K and 24K Versions are socketed for 32K and require only additional 2114's for expansion.

### FEATURES:

- Decoding for 4 Extended Address Lines (allows memory decoding up to 1 megabyte)
- DIP-switch to set extended addressing or disable it
- 4 separate 8K blocks, addressable to any 8K boundary by DIP-switch
- Each 8K block may be individually disabled
- Write protect either of two 16K sections
- Low power consumption — uses 2114L low power RAMS
- Fully Socketed
- Gold Bus Connectors
- Guaranteed 2MHz operation

## AND NOW . . . GIMIX OFFERS YOU A Choice of 6800 or 6809 CPU CARDS

You can order your system to fit your needs or select one of the below featured systems. Please contact the factory for further information and availability.

Add as much memory as you need using GIMIX Static RAM Cards for the utmost in reliability.

**32K 6800 SYSTEM . . . \$1,694.59**

Includes: Chassis, 6800 CPU, 32K RAM BOARD, I/O card

**32K 6809 SYSTEM . . . \$1,844.69**

Includes: Chassis, 6809 CPU, 32K RAM BOARD, I/O card

**32K 6809 PLUS SYSTEM . . . \$1,994.79**

Includes: Chassis, 32K RAM BOARD, I/O Card, and features our 6809 PLUS CPU Card with the Time of Day Clock option with battery back-up installed, as well as the 6840 Timer Package that provides 3 independent 16 bit counters.

This system also allows the following options to be added at additional cost:

- Battery back-up of the 1K RAM by substituting CMOS parts.
- A 9511 or 9512 Arithmetic Processor.
- GIMIX or SWTP Dynamic Address Translators.

### EXPORT NOTES:

For 50Hz 230V C.V. POWER SUPPLY . . . . . Add \$30.00  
80 x 24 VIDEO BOARDS — Specify Format (No Added Charge)

On Orders under \$250.00 for a Single Board, or Chips, please Add \$30.00 Handling and we will ship Air Mail Prepaid. On all other orders we will ship via Emery Air Freight Collect, and we will charge no handling. All orders must be prepaid in U.S. Funds. Please note that foreign checks have been taking about eight weeks for collection, so we would advise wiring money or checks drawn on a bank account in the U.S. Our bank is the Continental Illinois National Bank of Chicago, Account #73-32033. Visa or Master Charge also accepted.

### FACTORY PRIME STATIC RAMS

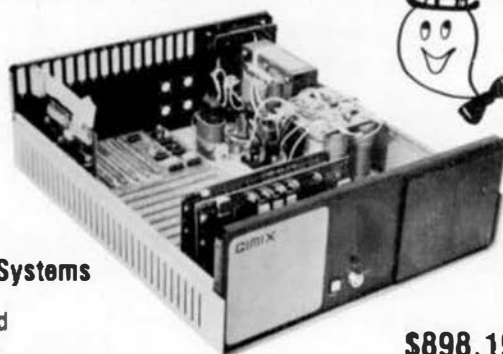
2114L 450 ns . . \$5.90    300 ns . . \$6.40    200 ns . . \$6.90

4044 450 ns . . \$5.90    250 ns . . \$6.90

ADD \$5.00 HANDLING ON ORDERS UNDER \$200.00

GIMIX® and GHOST® are Registered Trademarks of GIMIX INC.

## THE CLASSY CHASSIS



**\$898.19**

- 25 amp (5V) ferro-resonant constant voltage power supply.
- Heavy weight aluminum cabinet with 3 position key switch, fan, and provisions for two 5" disk drives.
- 6800/6809 Mother Board, fifteen 50 pin and eight DIP-switch addressable 30 pin slots (gold plated pins), fully decoded.
- Baud rate generator on I/O section of Mother Board.

### I/O BOARDS

for the 30 PIN BUS:

1 Port Serial (RS 232 or 20MA, current loop)	\$ 88.41
2 Port RS 232 Serial	128.43
2 Port Parallel	88.42

for the 50 PIN BUS:

8 Port RS 232 Serial	288.40
8 Port RS 232 Serial with on board Baud Rate generator	318.46
8 Port Parallel	198.45

### BOTH 6809 SYSTEMS

#### FEATURE OUR NEW TERMINAL BASED GMXBUG 09 SYSTEM MONITOR

GMXBUG 09 includes advanced debugging tools, utility, and memory manipulation routines.

Both 6809 Systems:

- ★ Can be reconfigured to allow use of other system monitors (OS-9 and SBUG-E)
- ★ Include 1K of Scratchpad RAM on the CPU
- ★ Allow optional software switching of system monitors.

2MHz 6809's at slight additional cost when they become available.

Phone, write, or see your dealer for details and prices on our broad range of Boards and Systems for the SS50/SS50C bus and our AC Power Control Products for all computers.



**GIMIX** inc.

The Company that delivers  
Quality Electronic products since 1975.

1337 WEST 37th PLACE, CHICAGO, IL 60609  
(312) 927-5510 • TWX 910-221-4055

SEE GHOST AD PAGES 36, 39, 44, 48



### OS-9™ LEVEL TWO MULTIUSER OPERATING SYSTEM

**T** rue multitasking, multiuser OS for timesharing or real-time control applications.

- Sophisticated memory management permits use of over one megabyte.
- Versatile, easy-to-use input/output supports multiple devices.
- UNIX™-like file structure including hierarchical directories, pipes, filters, and byte-addressable random access files.
- Provides log-on password protection and user file security.
- Can run on small, inexpensive systems with floppy disks and as little as 32K memory.

☐ \$495.00\*

### OS-9™ LEVEL ONE OPERATING SYSTEM

**S** ingle-user, single-memory map compatible subset of Level Two for software development or stand-alone control applications.

- Versatile input/output system can support multiple devices using interrupt-driven, DMA, or program-controlled data transfer. Users can easily add additional I/O devices.
  - Tape or disk-based versions available.
  - Disk versions support UNIX™-like hierarchical directory structure and byte-addressable random-access files.
  - Memory management for single address-space (up to 64K).
- ☐ Disk version \$150.00\*  
☐ Tape version \$95.00

### BASIC9™ PROGRAMMING LANGUAGE SYSTEM

**E** xtended BASIC language compiler/interpreter with integrated text editor and debug package. Runs standard BASIC programs or minimally-modified PASCAL programs.

- Permits multiple named program modules having local variables and identifiers. Modules are reentrant, position independent and ROMable.
- Additional control statements for structured programming: IF ... THEN ... ELSE, FOR ... NEXT, REPEAT ... UNTIL, WHILE ... DO, LOOP ...

## INTRODUCING

# 6809 SOFTWARE POWER TOOLS

BY MICROWARE™

ENDLOOP, EXITIF ... ENDEXIT.

- Allows user-defined data types and complex data structures. Five built-in data types: byte, integer, 9 digit floating-point, string and boolean.
- Extremely fast program execution.
- Available on ROM, disk or cassette tape. Runs under OS-9™ Level One or Level Two.

☐ Disk or tape \$195.00\*

### MICROSOFT 6809 BASIC

**S** tandard Microsoft BASIC optimized for the 6809 and OS-9™.

- Four data types: integer, string, single precision and double precision floating point.
- Program trace and edit capabilities.
- Automatic line numbering and renumbering.
- Supports random and sequential file I/O. Full PRINT USING for formatted output.

☐ Disk or tape \$250.00

### OS-9™ TEXT EDITOR

**M** inimum-keystroke macro text editor useful for text preparation or interactive word processing.

- User-defined macros with parameters permit virtually unlimited command expansion. Macros can be saved, loaded

and edited.

- Buffer, line and character oriented commands.
  - Search, change and extend operations.
  - Permits multiple input/output files.
- ☐ Disk or tape \$75.00  
☐ ROM set (2716) \$90.00

### OS-9™ INTERACTIVE ASSEMBLER

Compact Motorola compatible assembler for machine language program development.

- Operates in "batch" mode or interactive line-by-line mode.
- Facilities for generation of OS-9™ memory modules and system calls.
- Formatted listings include syntax and context error checking.

■ Runs on OS-9™ Level One or Level Two.

☐ Disk or tape \$75.00  
☐ ROM set (2716) \$90.00

### OS-9™ INTERACTIVE DEBUGGER

**F** acilitates testing and debugging of machine-language programs.

- Includes common "monitor" functions: memory examine/change, breakpoints, display/change registers, hexadecimal arithmetic, etc.

■ Access to system command interpreter.

■ Available on ROM, disk or cassette tape.

☐ Disk or tape \$35.00  
☐ ROM (2716) \$50.00

BASIC 9 is a trademark of Motorola. OS-9 is a trademark of Motorola and Microware\*. UNIX is a trademark of Bell Telephone Laboratories.

Most software is available on ROM, diskette and tape in versions for many popular 6809 computers. Source listings and yearly maintenance/update service are sold separately for most programs.

\*Specify manufacturer and type of CPU and I/O controllers. Contact Microware\* for specific availability.



**MICROWARE®**

Microware Systems Corporation  
5835 Grand Avenue, Box 4865  
Des Moines, Iowa 50304  
(515) 279-8844

## A/BASIC COMPILER

**T**his BASIC compiler generates pure, fast, efficient 6800 machine language from easy to write BASIC source programs. Uses ultra-fast integer math, extended string functions, boolean operators and real-time operations. Output is ROMable and runs *without any run-time package*. Disk versions have disk I/O statements and require 12K memory and host DOS. Cassette version runs in 8K and requires RT/68 operating system.

- ☐ Disk Extended Version 2.1 SSB or FLEX\* Diskette \$150.00
- ☐ Cassette Version 1.0. \$65.00

## A/BASIC SOURCE GENERATOR

**A**n "add-on" option for A/BASIC Compiler disk versions that adds an extra third pass which generates a full assembly-language output listing *and* assembly language source file. Uses original BASIC names and inserts BASIC source lines as comments.

- ☐ SSB or FLEX\* Diskette \$75.00

## A/BASIC INTERPRETER

**H**ere it is - a super-fast A/BASIC compiler! Now you can interactively edit, execute and debug A/BASIC programs with the ease of an interpreter - then compile to super efficient machine language. Also a superb stand-alone applications and control-oriented interpreter. Requires 8K RAM. The cassette

## INNOVATION AND PERFORMANCE

# 6800 SOFTWARE SUPER POWER

BY MICROWARE\*

version is perfect for Motorola D2 kits.

- ☐ Cassette, SSB or FLEX\* Diskette \$95.00

## LISP INTERPRETER

**T**he programming Language LISP offers exciting new possibilities for microcomputer applications. A highly interactive interpreter that uses list-type data structures which are simultaneously data and executable instructions. LISP features an unusual structured, recursive function-oriented syntax. Widely used for processing, artificial intelligence, education, simulation symbolic, and computer-aided design. 6800 LISP requires a minimum of 12K RAM.

- ☐ Cassette, SSB or FLEX\* Diskette \$75.00

\*FLEX is a trademark of Technical Systems Consultants

## RT/68 REAL TIME OPERATING SYSTEM

**MIKBUG** — compatible ROM that combines an improved monitor/debugger with a powerful multitasking real-time operating system. Supports up to 16 concurrent tasks at 8 priority levels plus real time clock and interrupt control.

Thousands in use since 1976 handling all types of applications. Available on 6830 (MIKBUG-type) or 2708 (EPROM-type) ROM. Manual is a classic on 6800 real-time applications and contains a full source program listing.

- ☐ RT68MX (6830) \$55.00
- ☐ RT68MX1P (2708) \$55.00

## 6800 CHESS

**A** challenging chess program for the 6800. Two selectable difficulty levels. Displays formatted chess board on standard terminals. Requires 8K memory. Machine language with A/BASIC source listing.

- ☐ Cassette, SSB or FLEX\* Diskette \$50.00

Our software is available for most 6800 systems on cassette or diskette unless otherwise noted. Phone orders welcomed. We accept MASTERCARD and VISA. We try to ship orders within 24 hours of receipt. Please call or write if you require additional information or our free catalog. Microware\* software is available for OEM and custom applications.



**MICROWARE\***

Microware Systems Corporation  
P.O. Box 4865, Des Moines, IA 50304  
(515) 279-8844

## MICROSOFT DISK EXTENDED BASIC FOR OS-9™

**M**icrosoft Basic is by far the world's most popular Basic language — and a vast library of applications software written for it can be used on your system: business packages, scientific, engineering and educational programs, games, etc. The OS-9™ version of Microsoft Basic is a full implementation of Release 5.0 with the following features:

- Four variable types: Integer, String, Single Precision Floating Point (7 Digit), Double Precision Floating Point (16 Digit).
- Full PRINT USING for formatted output (includes asterisk fill, floating \$, scientific notation, trailing sign, comma insertion).
- Trace Facilities for program debugging.
- Extensive program editing facilities via EDIT command.
- Matrices with up to 255 dimensions.
- IF/THEN/ELSE and WHILE/WEND for structured programming.
- Automatic Line numbering and renumber.

- Dynamic string space allocation.
- Random and sequential file I/O with variable length records.
- Protected files can be saved in coded binary format.
- CHAIN and COMMON statements — programs may be linked together and share common variables.

This version of Microsoft Basic is not just a reassembled 6800 Basic — it has been enhanced to take full advantage of the 6809 and OS-9™ superior capabilities. It is also a reliable Basic that you can count on for your important programs.

- ☐ Microsoft Extended Basic Release 5.0 for OS-9™ \$250.00

- ☐ Also available: Standard Microsoft 6800 or 6809 Basic Release 4.51 for Flex\*. Many features of OS-9™ version. \$250.00 \*Trademark of Technical Systems Consultants



**MICROWARE\***

5435 Grand, Box 4865, Des Moines, IA 50304 • (515) 279-8844

# In the world of 6800 Microcomputing there is only one Universal Mini-Disk System ...

## the PERCOM LFD-400<sup>TM</sup> with SOFTRAN<sup>TM</sup>

Made possible by SOFTRAN<sup>TM</sup>, an innovative \$24.95 translator program, the reliable Percom LFD-400<sup>TM</sup> has just been upgraded to the first universal mini-disk storage system.

Suddenly the two worlds of 6800 minidiskette software become one. Because the LFD-400<sup>TM</sup> with SOFTRAN<sup>TM</sup> can read either soft-sectored or hard-sectored disks.

And owning an LFD-400/SOFTRAN system means you can run minidiskette programs from the enormous combined selection of all of the principal 6800 software houses — TSC, Computerware, the Software Works, Hemenway Associates and of course Percom.

Available in versions for mini FLEX<sup>†</sup>, FLEX 2.0<sup>†</sup> and Smoke Signal Broadcasting Company's DOS, SOFTRAN<sup>TM</sup> copies soft-sectored minidiskettes track-for-track onto hard-sectored minidiskettes. If the source disk includes a FLEX<sup>†</sup> or 'Smoke' DOS, SOFTRAN<sup>TM</sup> is used to modify the operating system to function with the Percom LFD-400<sup>TM</sup>.

SOFTRAN<sup>TM</sup> is supplied on a minidiskette along with utilities for only \$24.95. A users manual is included. You must indicate whether SOFTRAN<sup>TM</sup> is to be used for mini FLEX<sup>†</sup>, FLEX 2.0<sup>†</sup> or Smoke's DOS.

The Percom LFD-400<sup>TM</sup> mini-disk system sells for

only \$599.95, complete with: (1) the drive, drive electronics and Percom's rugged PS-401 power supply all in a finished enclosure, (2) a demonstrably superior controller PC card featuring an explicit data/ clock separation circuit, MPX, a remarkable 2K DOS, and provision for 1K extra PROM, (3) an interconnecting cable and (4) a 70-page users manual.

Also available: Upgrade kits for SWTP or 'Smoke' mini-disk drive systems. Kit includes LFD-400<sup>TM</sup> controller, MPX DOS & SOFTRAN<sup>TM</sup>. Only \$224.95.

Available soon!

SOFTRAN<sup>TM</sup> for Percom's 77-track LFD-800<sup>TM</sup> mini-disk system; SOFTRAN/9<sup>TM</sup> for 6809 FLEX<sup>†</sup> files and programs.

<sup>†</sup> trademark of Technical Systems Consultants, Inc.



<sup>TM</sup> trademark of Percom Data Company, Inc.

# PERCOM

PERCOM DATA COMPANY, INC.  
211 N. KIRBY, GARLAND, TEXAS 75042  
(214) 272-3421

Percom 'peripherals for personal computing'

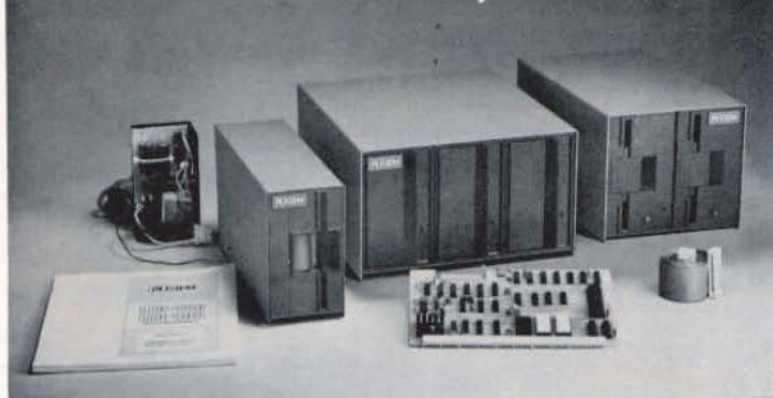
To place an order or request additional literature call toll-free 1-800-527-1592. For technical information call (214) 272-3421. Orders may be paid by check, money order, COD or charged to a VISA or Master Charge account. Texas residents must add 5% sales tax.

PRICES AND SPECIFICATIONS SUBJECT TO CHANGE WITHOUT NOTICE



# A Few Extraordinary Products for Your 6800/6809 Computer

## SS-50 Bus LFD-400™ and LFD-800™ Systems



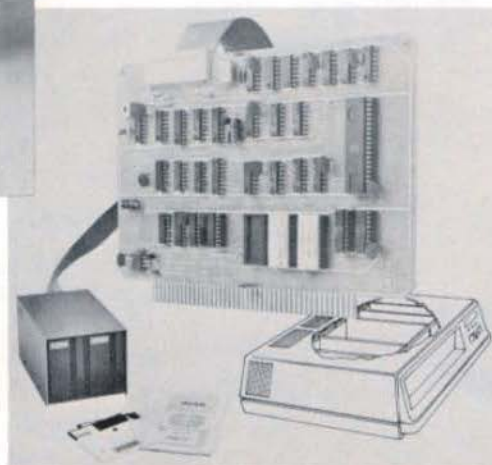
Percom mini-disk systems start as low as \$599.95, ready to plug in and run. You can't get better quality or a broader selection of disk software from any other microcomputer disk system manufacturer — at any price!

**Features:** 1-, 2- and 3-drive systems in 40- and 77-track versions store 102K- to 591K-bytes of random access data on-line • controllers include explicit clock/data separation circuit, motor inactivity time-out cir-

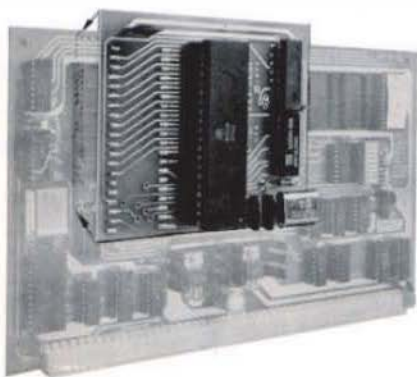
cuit, buffered control lines and other mature design concepts • ROM DOS included with SS-50 bus version — optional DOSs for EXORciser® bus • extra PROM sockets on-board • EXORciser® bus version has 1K-byte RAM • supported by extended disk operating systems; assemblers and other program development/debugging aids; BASIC, FORTRAN, Pascal and SPL/M languages; and, business application programs.

From Percom . . .

**Low Cost  
Mini-Disk Storage  
in the Size You Want**



EXORciser® Bus LFD-400EX™ -800EX™ Systems



### Upgrade to 6809 Computing Power

This 6809 upgrade adapter may be used on the SWTP 6800 and most other 6800/6802 MPU cards. Supplied assembled and tested, it costs only \$69.95 with user instructions. The original system may be restored by merely unplugging the adapter and a wire-jumpered DIP header, and re-inserting the original components. Also available for your upgrade computer is PSYMON™, the Percom SYSTEM MONitor for the Percom 6809 single-board computer. PSYMON™ on 2716 ROM costs only \$69.95 — PSYMON™ is also available on minidiskette, with source and object files, from the Percom Users Group.

™ trademark of Percom Data Company, Inc.

® trademark of the Motorola Corporation.

Prices and specifications subject to change without notice.

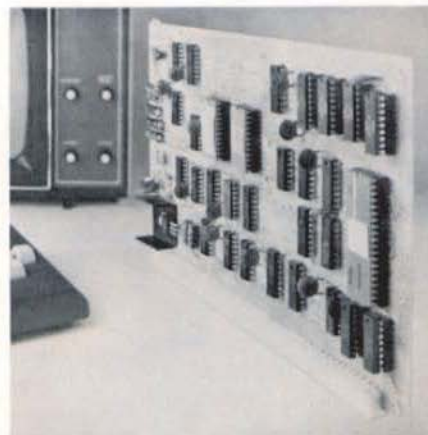
### Full Feature Prototyping PC Boards

Percom SS-50 and I/O bus prototyping cards include all of the features needed for easy, straightforward prototyping. Use wire wrap, wiring pencil or solder wiring. **Features:** tin-lead plating over 2 oz. copper wets quickly, solder easily • provision for power regulators and distributed capacitor bypassing • SS-50 bus card accommodates 34- and

50-pin ribbon connectors on top edge, 10-pin Molex connector on side edge — costs only \$24.95 • I/O bus card is 1-1/4" higher than SWTP I/O card, accommodates 34-pin ribbon connector and 12-pin Molex connector on top edge — costs only \$14.95 • Both card designs accept 14-, 16-, 24- and 40-pin DIP sockets.

### The Electric Window™: Instant, Real-Time Video Display Control

This VDC card resides completely in main memory so that control is accomplished instantly by direct MPU access to the on-board 2K character-store memory and the display control registers. Price is only \$249.95. **Features:** Programmable CRT controller chip provides extraordinary capability for software control of functions such as number of characters per line, number of lines displayed, highlighting and interlaced or non-interlaced scan • includes ASCII 128-unit character generator which generates 7-dol by 12-dol characters — lower case letters have descenders • provision for optional ROM for special characters/symbols • comprehensive manual includes full listing of WINDEX™, the Electric Window™ driver program — WINDEX™ is also available on minidiskette through the Percom Users Group.



**PERCOM**

PERCOM DATA COMPANY, INC.  
211 N. GREGG GARLAND, TEXAS 75042  
(214) 272-3421

Products are available at Percom dealers nationwide. Call toll-free, 1-800-527-1592, for the address of your nearest dealer, or to order direct.

# SOFTWARE...

# MSI has MORE!

**WE INVITE YOU TO LOOK AT OUR NEW SOFTWARE CATALOG  
WHICH OFFERS NEW PROGRAMS FOR YOUR 6800 SYSTEM.**

\*All FLEX™ Programs from TSC are now available for MSI Computer Systems.

\*MULTI-DISK FLEX™ from MSI allows the use of any combination of MSI disk devices to be used simultaneously, including the HD-8/R 10 megabyte drive.

\*SORT/MERGE Program can be used manually or within other BASIC or assembler programs to perform high speed sorts of data files.

\*Hemenway Associates Software Products for use under FLEX™ are available on the MSI System.

\*TRS-80/MICROSOFT BASIC - MSI BASIC Translator allows MSI users to run the large library of basic programs written for the TRS-80 and other similar systems.

\*SOFTWARE LIBRARY Programs keep track of all diskette and hard disk directories, giving alphabetical listings of available programs.

\*SDOS Operating System.

\*MULTI-USER/MULTI-TASKING SDOS Operating System allows any user to perform edits, assemblies, compilations, or program executions independently and simultaneously.

\*All MSI software is supported on four (4) disk systems: quad density minifloppy, single and double density 8" floppy, as well hard disk systems.

\*Complete BUSINESS APPLICATION PACKAGES including sales order entry, accounts receivable, inventory management, purchase order entry, accounts payable, and general ledger are available on MSI hard disk systems.

\*PLOTting PACKAGE gives daisy-wheel printers the capacity to perform graphics operations.

\*LETTERWRITER Word Processing Software allows the use of daisy-wheel printers to generate documents and to handle correspondence automatically.

FLEX™ is a registered trademark of Technical Systems Consultants, Inc.

*Send for your catalog today.*

## MidwestScientificInstruments

220 W. Cedar • Olathe, Kansas 66061 • 913-764-3273

TWX 910 749 6403 (MSI OLAT)

Telex 42525 (MSI A OLAT)



HEAR YE!

HEAR YE!

HEAR YE!

# SOFTWARE ANNOUNCEMENT

JCP

**Job Control Program**  
By Peter Murray

NOW INCLUDES LIBJCP

The JOB CONTROL PROGRAM (JCP) reads a text file that contains the necessary input for a program and then supplies this input to the program in the same manner that an operator would have normally entered it from the keyboard. The file containing the input is referred to as the procedure file, and the program receiving the input is referred to as the calling program. A procedure file contains input for such calling programs as FLEX™, FLEX utility commands, and other development software.

LIBJCP is used as a FLEX™ command within a procedure to load and execute another procedure. At the conclusion of the called procedure, control will return to the calling procedure and execution will resume at the line following the LIBJCP command.

JCP also provides for parameter substitution within the procedure file, special commands to control JCP program flow, and a means for recovery from processing errors. These features allow for commonly used file routines to be written as a generalized procedure that JCP will execute, unattended, simply by entering a single FLEX command.

PRICE \$89.95

INTRO PRICE UNTIL OCT. 1, 1980 \$39.95

**READTEST**

**English Text Analysis Program**  
By Dale Puckett

**NEW**

READTEST is a must for all writers and writing instructors. Reads prose from disk file and tells how well it was written. Reports number of lines, words, sentences, personal words, affixes, average sentence length. Individual reports pinpoint trouble areas. Overall index tells who can read it and who would print it. Fast 6800 object code. Runs in FLEX™.

READTEST, a 6800 assembly language program written by 68 Micro Journal Contributing Editor Dale L. Puckett, is such an indispensable applications program for all writers, fiction or non-fiction, student or professional.

READTEST reads your letters, short stories, news stories, reviews, novels, etc., from the disk file you prepared them on and tells you how well they were written.

READTEST is a powerful tool designed to aid both the student writer and keep a running check on the experienced writer. It is a serious application of your 6800 microcomputer that will pay for itself with the first check you receive for a readable manuscript.

See Review in Aug. '80 '68' Micro



AVAILABLE SOON

**HELP**

**Help for FLEX™**  
By Frank Hogg

Forgot the command syntax? Type HELPI! HELPI keeps information at your fingertips. It eliminates the need to fumble through manuals and also helps beginners operate your computer.

The HELPI interpreter with its 6+ commands reads information from one of three text files, so adding, modifying or deleting information is easy. You can also create your own HELPI file. Everybody needs a little HELPI!

SPECIAL PRICE \$24.95

AVAILABLE NOW!

**REMOTE**

**Intelligent Terminal Program**  
By Tom Speer

REMOTE and a modem give you access to community bulletin board systems, timesharing computer systems, other microcomputer systems, etc.

Local commands allow you to receive and transmit FLEX™ files, turn the printer on and off, control parity checking, etc. Output may be optionally directed to any combination of devices simultaneously (printer, disk, CRT). And you can execute most FLEX commands from REMOTE.

INTRO PRICE \$39.95

**ESTHER**  
**An exercise in artificial intelligence**  
By Dale Puckett

ESTHER is Eliza+. Artificial intelligence in pure 6800 code. Source shows how. Object amazes friends. ESTHER; remembers names, drops them, uses players name, answers third person replies, echos keywords. 75+ keywords. 48+ sets of replies. Auto line length. Runs in FLEX™. Obeys TTYSET. ESTHER is both educational and fun !!!

APPROX. 16K : INTRO PRICE \$39.95

FLEX is a trademark of Technical Systems Consultants, Inc.



**FRANK HOGG**

**DENTAL LABORATORY**  
130 Midtown Plaza  
700 East Water St.  
Syracuse, N.Y. 13210

(315) 474-7856

All software is currently available on FLEX™ 2 0 5" disks or MSX FLEX™ 1 0 8" hard sector disks. The package includes a users manual, the disk with object code AND FULLY COMMENTED SOURCE LISTING, a programming manual with information about the program and hints for changes, and where applicable example programs. 6809 version (being worked on now) will utilize the 6809 architecture and be fully position independent. VISA and MC accepted. SOURCE TCF339.

## WARRANTIES

No doubt you have noticed that this is not our usual quality print-out. It is produced on an MPI economy dot matrix printer that we had received for review. It has changeable character font sizes and a lot of other fine features, especially for the price. We are driving it at a 1200 baud rate, bidirectional print and in the 15 CPI mode. A complete review upcoming after we have had a chance to put it thru it's paces. So far it has worked fine and for a three (3) wire hook-up, including handshaking, and the low price of about \$750.00, it appears to be an excellent buy.

Which brings us to a point that I feel needs to be made. When buying a product, despite it's hyped quality, find out about service. Especially, how long, where and how much!!!!!!

We have been using for less than a year a Qume Sprint 3 daisy wheel printer, less than 10 hours a week total running. Upon it's arrival we were somewhat dismayed to find a couple of springs rattling around loose inside the chassis. Thanks to the immediate assistance of Dan Meyer of SWTPC we were able to locate where all the springs went, all except one. We knew where it (spring) went but it was not to be found. Also I did not want to completely disassemble the whole machine as it is rather complex to reassemble. So we fired it up and it functioned fine, minus a spring on the platen plate (which uses two) but can be tensioned by the remaining one. With the assistance of SWTPC (who had a service manual, which was not included with the printer) we proceeded to use the Qume printer, that is up until last Friday.

Now we know where the other spring went, down in the logic boards rattling around, I guess. As Murphy would have it we got a small puff of smoke and it died. Upon disassembly we found the missing spring and also realized that we had bad problems, as this was our primary and only quality letter printer.

Now came the fun? First we called our nearest Qume service depot in Atlanta, Georgia, some 120 miles south. NO, they did not service the Qume Sprint 3, but they would service a Sprint 5. Why, I asked. Well it seems that the Sprint 3 is sold with the assumption that the user or supplier is supposed to do the servicing (despite no manuals included) and also there was no logic board exchange plan. There are four logic boards in the Sprint 3 including the mother board, all highly populated.

We were informed that we could either send it back to the factory in California or maybe to their service center in New Jersey, but would have to call and get an ok. Needless to say we are down and have no idea how long it will be. It seems that we assumed that Qume offered service on a par with other printer vendors, looks as if we might have been wrong.

Starting next week we will contact printer manufacturers to find out just exactly what their policy is concerning when, where and how much. When we find out I will let you know. During the meantime I suggest that you pin down this important aspect of buying a complex piece of equipment BEFORE YOU PLUNK DOWN YOUR HARD EARNED BREAD!!!!!! Maybe this will all work out ok with Qume in the next week or so. To be fair with them and you our readers both I must admit that this occurred on a Friday and I have not been able to talk to the folks at the home office of Qume. I did telephone Qume and left my name and phone number twice, was promised both time a call back in about 45 minutes or so. It never came..... Well will try again Monday.

The reason I report this now is that today (Sunday

evening, 9:30 P.M.) we are finalizing this issue and can wait no longer. Felt that you should be aware just in case we have found a real burner. If not will let you know next month the outcome.

So some of our articles will be dot matrix until we either get our Qume Sprint 3 running or buy another daisy wheel printer.

Monday 3:00 P.M.; finally contacted Qume in New Jersey, a very nice young lady explained the service policy concerning this unit. For normal repairs a minimum of \$135.00. This returned in about 3 to 4 weeks. For an additional \$50.00 a three days maximum turn-around. Freight your expense both ways. We have forwarded the unit for the three day turn-around. Will keep you informed of the quality, price and total downtime.

DMW

## VC-256 VIDEO GRAPHICS

Dave Hanon  
Box 237C Rt. 6  
Rindsgold, GA 30736

The VC-256 video controller is a black and white graphics display board with 256 X 256 resolution which plugs into a standard 30 pin I/O port on a 68XX computer.

Communication with the board is by way of four registers corresponding to the port to which it is attached. The first address is a write only register which receives the "X" coordinate of the dot to be displayed. The first register also serves as a read only register to determine the status of the board.

The second register is a write only register which receives the "Y" coordinate of the dot to be displayed.

The third register is a write only register in which various bits determine whether a white or black dot is written or whether the display is blanked or unblanked.

The fourth register is the erase register. When the high order bit is written high the complete display is erased in 1/60 of a second.

Well, enough for the technical aspects except to say that the board has a very professional appearance and it is notable for its lack of components other than IC's, which means to me, a well designed circuit which does not depend on R/C time constants for cleaning up timing problems or glitches.

I was very interested when I heard this board was coming for evaluation because I have a great interest in video graphics and computer image storage and processing. The performance of the board was certainly no disappointment. There were several programs sent with the controller as samples of what could be done for graphics display. Most impressive was a program which ran in basic and drew a "LIMACON". This was a mathematical function which had a three dimensional appearance with the outline shape of a lima bean. The program took about ten minutes to run because there were several trig functions to calculate and about one thousand points to plot. I quickly wrote a machine language routine to save the picture in system memory and then dump it to the graphics controller memory. This version took less than one second to display the same image.

I am finding it hard to get this review completed due to the fact that I am spending all my time writing programs for new designs. It is very easy to draw circles, boxes, triangles, cloverleaves, flowers, and many more designs from mathematical functions in basic.



Soon after I knew the board was coming I began to try to figure a way to display television images on it. I figured the display could be divided into a 128 X 128 array of four dots each. By turning 0, 1, 2, 3, or 4 dots on I could get a five level gray scale. It worked easily. I input the picture into my system by way of a DIGI-SECTOR board from "The Micro Works". A simple machine language program converts the stored picture to the monitor screen in about 2 seconds. It looks quite good considering only 5 levels of gray. The resolution is quite good and I think with a slight hardware modification 16 levels of gray could be attained, which would give a picture of the quality normally sent by amateur radio slow scan television transmissions.

I have found it difficult to find anything to complain about in this product. In the documentation they mention that some monitors may only display about 250 vertical lines and my monitor was one of them but I didn't find it to be a serious drawback. The reason seems to be that the vertical sync pulse provided from the controller is very short and some monitors will not do a vertical retrace fast enough to be back to the top of the screen by the time the video information starts.

I hope that there will be other versions of this product to follow, possibly with 512 X 512 matrix or with gray-scale capability built in.

I think that anyone who has an interest in video graphics will be well pleased with the VC-256.

Additional information concerning this product can be secured by calling or writing:

HAZLEWOOD COMPUTER SYSTEMS  
7413 N. Lindbergh  
Hawley, MO 63042  
(314)-837-3466

## FLEX USER NOTES

BY RONALD W. ANDERSON  
3540 STURBRIDGE COURT  
ANN ARBOR, MI 48105

Well, here's offering number three of my Notes through '68' Micro Journal, and the first hasn't yet been published. I had a conversation with Don Williams by phone the other night and he suggested a more "tutorial" approach to the information here, so I will try to give more of the "why" and the "how" along with the "what".

I read with interest a letter in the May issue, reminding us all that there are many 6800 users who don't have disk drives and 56K memory. Of course, since this column is primarily for FLEX Users, we are assuming that those interested will have one or more disk drives. Frankly, had I not the absolute necessity to learn 6800 programming, and to write large programs, I could not justify the cost

of a multi drive disk system (I have three SA-400 drives.) I have the added excuse that I would soon be obsolete as an engineer if I didn't keep up with this technology.

Having Mini-floppy drives is a perfectly adequate solution to writing large programs in Assembler, though I have some that won't fit one disk. The solution is of course to write these long programs in "segments". For example, in one system for a smart machine, we have a math package and a CRT driver package that are convenient modules. The other programs need only have the necessary equates to call these programs as needed. The only inconvenience then in writing a very large set of programs is the considerable "disk swapping" required. It is human nature (at least with me) always to want more than I have. I of course long for a pair of 8 inch drives, hopefully of the dual density, double sided variety, so I won't run out of disk space.

## BASICALLY SPEAKING.....

I just finished a seven working day stint of writing a program in BASIC to "simulate" a final program in Assembler, for a balancing machine that is to have a keypad and a CRT as the operator interface. My employer recently finished the first of a line of such machines and delivered it to a customer. The program was done in Assembler and there was a great deal of second guessing about what the screen should say and when. You may or may not imagine that any change to a program in Assembler that takes 11K of EPROM and lists to 160 or so pages, would take about a day. It does take about that. I don't think I made one change that worked as desired the first time. Fortunately, there is a lot of output to the CRT and most of the dumb errors were fairly obvious. However, just editing one of the long files and fixing the equates in several others because the file changed length and some of the entry points were "moved", and then reprogramming all the EPROMS took considerable time.

After finishing up that project, I decided that for the next, it might be

easier to work out all the wordings for the CRT and the operating sequence in BASIC first. I also worked out all the necessary calculations that had to be done by the program and generated some dummy input data, the results of which were known. I was able therefore to check out the number crunching routines too. The listing, which is abundant with REM statements, runs 10 pages, and the program overflowed my 32K memory when loaded with a BASIC interpreter. I had to write a short program to read the file and remove all the REM lines to get the program to fit memory.

It occurs to me now, that if I had any kind of compiler that would do floating point arithmetic and interface to a couple of already written Assembler routines that read the data, I would have a finished program that could be used in the product. Ten pages of BASIC program (or Pascal, etc.) and seven working days, as opposed to 6 man months and 160 pages of Assembler code for the first machine looks pretty good! I could take a couple of weeks to translate to some other language and implement the linkages to the necessary assembler routines, and still be way ahead. Even the BASIC version with the interpreter runs acceptably fast, and uses about 28K of memory as opposed to my 11K for the other machine in Assembler. A few hundred dollars worth of hardware seems a small price to pay for a reduction of 5 man months in the programming time!

Since writing the above, I received word from Lucidata regarding licensing of their runtime package, and a frommable version of their Pascal soon to be available. The price was such that the possibility is very attractive. I converted the program mentioned above to Pascal in two long working days, and will have only to add a couple of Assembler User routines to make it compatible with the machine. The whole thing will be less than 18K, and so far therefore looks more efficient than the BASIC interpreter version.

On the basis of this successful test, I will be sending an order to Lucidata for the company's copy of Pascal in the frommable version within

a few days, and beginning the process of a license agreement.

#### THE NUMBERS GAME

Just for a little aside that has nothing to do with FLEX but perhaps something to do with number theory and probability, this is included here. Did you ever receive a chain letter? My son received one the other night from a friend in Maine. It said essentially that it was an educational chain letter approved by the U. S. Postal Service, and that the receiver was to send a picture post card to the child whose name and address appeared at the top of a list of 6 such names and addresses, and then to copy the letter, removing the top name and adding his to the bottom, and mail 6 copies to six friends. The letter went on to say that if these instructions were followed, my son would receive 100 postcards in about 18 days. The instructions indicated that the letters had to be mailed in 6 days or less.

There are 6 names on the letter at all times. The bottom name gets mailed to 6 people who add their name and mail the letter to 36 more people, etc. The number of postcards mailed to the top name, if all people followed instructions would be therefore 6 to the 6th power or 46,656!! The letter went on to say that this letter had been going since January 1975. Assuming that everyone mailed his 6 letters in 6 days, and that the average mail time was 4 days, there were 36 "generations" of letters per year. the number 6 to the 36th power is very nearly  $10^{128}$ . That means that if the letter went for one year without the "chain being broken" as the letter implies, everyone (ie, every person) in the world would have received on the average about 5 times  $10^{118}$  letters, or about 5 billion billion letters. We normally think of the population of the World as an infinitely large number. It is of course about 2 or 3 times  $10^{19}$ .

The reason chain letters sound so good is that the number of items received is so large for the number sent. This implies a large number of



people involved. Few of us stop to think just how many, and how ridiculous are the claims of such letters. (We did perpetuate the chain, as perhaps the 100 postcard estimate is close to the actual number, taking into account all those who just throw the letters away.) It will be interesting to see just how many do arrive eventually.

#### NICE THINGS IN PASCAL

Having just finished a marathon programming project, I have to pass on to you a couple of nice things I found in Pascal. I'll use a game as an example, though my program was asking for operator input for a balancing machine. You have all probably played SWITCH or REVERSE as it is known in various versions from 101 Games in BASIC and/or the People's Computer Company. In this game you are given a list of 9 numbers in random order and by reversing the order of a number of them at the left, you are to order them from 1 to 9. The program asks "REVERSE HOW MANY ?" and you are to respond with a number from 2 to 9. (Reversing 1 would be meaningless.) In BASIC a check for valid reply would be: IF N<2 OR N>9 THEN (LINENUMBER) where linenumber would set you back to asking the question again.

In Pascal, there is a nice way to implement such a validity check.

```
REPEAT
  WRITE ("REVERSE HOW MANY ? ");
  READ (N)
UNTIL N IN [2..9];
```

This structure is a repeat loop with the test at the end, so that the loop is always executed at least once. The structure IN [A..B] checks the variable to see that it is within the range indicated, taking A as the lowest ordered value and B as the highest. Since the structure is a repeat loop, if the exit condition is not satisfied the question is asked again until a valid value is entered. Lucidata's Pascal will give a further error message if the response is not a number. This works in lots of places in a program. To give you some ideas, you

could test for valid entries for dates for example by, IF MONTH IN [1..12], IF DAY IN [1..31], IF YEAR IN [0..99], etc. There are other ways to limit the range of variables in Pascal that could be used to force Pascal to flag an error and ask for another response, though in my program I wanted to control the format of the error message, and thus wanted to generate my own. The more straightforward method is to declare the data as a subrange type.

#### TYPE

```
MONTHS = 1..12;
DAYS = 1..31;
YEARS = 0..99;
```

This "ultra versatility" in declaring variable types and subranges is one of the key features of Pascal and is one of the confusing things in learning about it. Having declared these data types, you would now have to declare variables of those types, as MONTH : MONTHS; DAY : DAYS; YEAR : YEARS; . Pascal has "predeclared" types such as INTEGER, CHAR, REAL, BOOLEAN, etc. you would declare an index variable (such as N for use in a loop FOR N:= 1 TO 33 DO; ) as an integer simply as N : INTEGER;. Arrays are declared similarly as DATA : ARRAY [1..10] OF INTEGER; or, a two dimensional array as NUMBERS : ARRAY [1..10,1..5] OF REAL;. In case you are not a programmer with Fortran experience, a REAL variable is one that allows fractional decimal values such as 3.14159265 for PI. Integer values are of course limited to whole numbers. Enough lesson on Pascal for this time. If you are interested in further "tutorials" please let me know, and we will expand this sort of thing along with continuing the publication of original programs.

#### A SURPRISE FOR ME

A day ago, I received a letter that gave me a start. I work for a company called Balance Technology, here in Ann Arbor. I received a letter asking about the FLEX User's Group in an envelope with a familiar name, that of a company, a division of which is

one of our competitors. Competition is friendly, but I wouldn't want to give away too much information regarding our use of Microprocessors in our product. I will therefore use examples from games or simple unrelated program segments in this column.

#### MULTIPLE PRINTERS ?

I received a phone call from Phil Hamilton of Stearns KY yesterday. He was referred to me by TSC as a source of help. Phil wanted to know how to connect two printers to his system and be able to select which one is used for output by the P command. I gave him a little help by phone, but later thought of a simpler way out. A copy of this will be sent to him as soon as it is done, but I thought maybe some others could use the information too. If you have your FLEX2 manual handy, refer to pages 54 and 55 for a listing of the P utility command. The key to a simple switch of printers lies the code at address \$A123 at the second line of code on page 55. P.CMD checks the first byte of the print routine that is at \$ACE4. Apparently when FLEX2 is loaded, this byte contains an RTS \$39. If PRINT SYS has been loaded previously, that byte is the first byte of the printer output routine. If some other instruction than RTS is found there, PRINT.SYS is assumed loaded, and the P.CMD skips down to label P15, where it calls the printer initialization routine. That fact too is significant.

Suppose that you were to have an "alternate" PRINT.SYS file. It would have to have a different name, say PRINT2.SYS. Now, if you want to print through your normal print channel, you do everything as before. I.e. the command line is P,LIST,FILENAME. if you want to use the alternate channel, you simply first "switch channels" by typing "GET,PRINT2.SYS,0". Now, any command preceded by P will cause output to the alternate device. To restore output to the primary printer again, you simply type "GET,PRINT.SYS,0".

I have included here a listing of my PRINT.SYS because I found that TSC's would hang my Integral Data Systems

printer more often than not. This routine drives it flawlessly, except that if I happen to hit system reset for any reason, I must turn the printer off and on again to set it initialized, or it will ignore my efforts to print. If any of you know the why's and how's of fixing that problem with a software fix, please let me know. This printer driver was arrived at by a couple of hours of trial and error, and I don't know why it works better than that of TSC. I have thought of the hardware fix of running my 6800 reset line to the printer and pulling down its processor reset, which is what happens when it is turned off and back on.

Anyway, once you have a driver for each of your two output devices, and they need not be identical or even similar, you can use this approach to switch outputs. If your two devices are identical, and are PR-40, Centronics, or IDS compatible, (as are most of the parallel interface printers), you simply need to change the equate for PIA at the top of the PRINT.SYS routine. Remember that Port 0 is at \$8000, and that the port address increase by four (hex). That is, port 1 is at \$8004, port 2 at \$8008 etc. If anyone out there has a smarter way to do it, please let us in on it. I presently have only the IDS but I have an old IBM that I am interfacing to my system. Until the call yesterday, I had not given a lot of thought to how to switch. One could of course also have two P.CMD files, one called P2.CMD or some such, that is modified to put the filename PRINT2.SYS in the FCB so it is loaded rather than PRINT.SYS. In this case, rather than checking the first byte of the print routine to see if it is already loaded, you could modify the test in P.CMD to check a byte that is unique, such as the second byte of the PIA address, and load the proper print routine if the wrong one were presently loaded.

Phil, I hope this gives you some ideas on how to solve your problem. Anyone else out there, beginner or not, please feel free to ask for aid in such matters. I don't promise to know the best answer, or even to have an answer immediately, but between all of us, there is probably enough knowledge to



set almost any "how do I connect." problem solved.

#### TO 9 OR NOT TO 9 ?

That is the question for many of you. Is the investment in the 6809 processor board and a whole new set of software justified? Of course, my answer is, that it all depends. If you run programs in BASIC, and don't need to reduce the computation time by 20 or 30 percent, you wouldn't see the difference. Your only valid reason for going to the '09' is that the software is written so that the system I/O and monitor reside in the high eighth of the normal 64K memory space directly addressable with the 6800/09. That means that you can install another 16K of contiguous memory, and have 48K from \$0000 right on up to FLEX 9 at \$C000. If you need all that much memory, and are not planning on one of the newer 16K or 32K boards, however, be prepared to beef up your power supply.

If you like to play with Assembler programs, and/or have the computer system as an educational thing associated with your profession (as I do), then you have justification for the investment. Remember, however, that the hardware is the smaller part of the investment, and that unless you need to write "high performance" Assembler software, you will only see the difference when you program. When you run user programs, the results will be no different. Of course the same can be said for software run on other processors. If the program "does the same thing", it is impossible to tell which processor is being used. (I might add, that it may be difficult or impossible to tell in which higher level language a particular program is written.)

If you use a development system to generate Assembler code that is part of an applications package, and you spend a significant fraction of your normal work week programming, the savings in programming and debug time brought about by the more powerful instruction set will pay for the '09' in short order. Because I write this column, and because I have to support software written for applications on the 6800, I

will keep my 6800 going for a long time to come, but will use the '09' more and more for new applications. Frankly, running the 6809 was to me a bit of a letdown. I can't say exactly what I expected, maybe a more dramatic increase in speed, perhaps suddenly the ability to generate long and complex programs in Assembler with little effort. At this moment, I am writing and editing this material on my terminal with the '09' up and running. If it were not for the fact that I changed the prompt from +++ to 9++, I would see no difference. The whole operation is limited by the speed with which I can type material into the system. The disk access is no faster or slower than previously, and in general, there is no difference in the operation from the user's viewpoint.

Well, perhaps I've said enough for this time. This column will vary in length and content from month to month, a characteristic some of my early readers will recognize. My approach has been to write about something related to what I am doing currently, and if this results in too random an approach, I'm truly sorry. As always I am open to suggestions and comments, and willing to learn and change for the sake of meeting the needs of more of the readers. Please let me hear from you.

\* PRINT.SYS PIA DRIVERS FOR IDS PRINTER  
\* FLEX 2.0 OR FLEX 1.0 VERSION \*

\*  
PIA EQU \$801C ADDRESS FOR PORT 7

\*  
\* PRINTER INITIALIZATION  
\*

ACCO			ORG	\$ACCO
ACC0 86 3A	PINIT		LDA A	\$\$3A
ACC2 B7 80 1D			STA A	PIA+1
ACC5 86 FF			LDA A	\$\$FF
ACC7 B7 80 1C			STA A	PIA
ACCA 86 3E			LDA A	\$\$3E
ACCC B7 80 1D	POUTB		STA A	PIA+1
ACCF 39			RTS	

\*  
\* CHECK FOR PRINTER READY  
\*

ACD8			ORG	\$ACD8
ACD8 7D 80 1D	PCHK		TST	PIA+1
ACD8 39			RTS	

```

ACIC 86 36    CHROUT  LDA A  $336
ACDE 8D EC          BSR   POUTB
ACE0 86 3E          LDA A  $33E
ACE2 20 E8          BRA   POUTB

```

```


*
* OUTPUT CHARACTER ROUTINE
*

```

```

ACE4          ORG   $ACE4
ACE4 8D F2    POUT  BSR   PCHK
ACE6 2A FC          BPL   POUT
ACE8 7D 80 1C      TST   PIA
ACEB B7 80 1C    POUT1 STA A PIA
ACEE 20 EC          BRA   CHROUT
END

```



NO ERROR(S) DETECTED CLEAR READY FLAG

## SOFTWARE DYNAMICS COMPILER

John K. Jordan  
103 Elliott Circle  
Oak Ridge, TN 37830

For the programmer needing a powerful tool for business and application systems, Software Dynamics offers a comprehensive package of development programs. This review takes a look at the Software Dynamics 6800 BASIC compiler, assembler, and editor.

Although these programs normally live within the environment of Software Dynamics' own disk operating system, SDOS, they were written to be system independent. A system-dependent I/O package can be provided to allow interfacing with nearly any hardware and disk operating system configuration. The programs considered in this review were run on a 40K SWTP 6800 computer system using the 8" FLEX disk operating system.

SD software is available directly from Software Dynamics, 2111 W. Crescent, Suite G, Anaheim, CA 92801. The BASIC compiler sells for \$350. This price includes a set of manuals, the compiler, a RUN time package, the 6800 assembler, several utility programs, and an I/O package tailored to your system. The assembler, which is needed for the compiler, is also available separately for \$140. An editor program of some sort is required to prepare source programs for the compiler. The Software Dynamics EDIT program is \$110.

In addition to the programs mentioned above, the complete source listing for the I/O package (IOPACK) is available. Instructions are given to enable the user to customize the I/O package if desired. For example, a simple modification could change the system printer configuration. This would involve reassembling IOPACK with new parameters, then appending the new I/O package to the existing system programs. An EXEC file named SYSGEN is provided to make this process a simple one. Source listings are also provided for most of the utilities on the disk. (Source listings for the compiler, assembler, and editor are not available.)

Even at first glance, the SD software is quite impressive. The documentation is excellent. The compiler and assembler manuals are each over 100 pages in length. The manuals are well organized and leave nothing to guesswork. In addition, the FLEX version is accompanied by a ten-page document with specifics on how to use the SD BASIC with SWTP MINI and DMAF disk drives. Compare this to the single

page or paragraph that all too often accompanies software!

## \*\*\* 6800 BASIC COMPILER \*\*\*

There is no doubt that the SD BASIC compiler was written with the professional programmer in mind. Many features are provided which simplify the design and maintenance of complex application software. This should not imply that the package is off limits to a beginning programmer. The richness of commands available to the operator, however, may put a strain on the casual user.

As the manual introduces the compiler, it was designed to be a "programming tool for building high-performance process control programs and production business applications." It is a floating point compiler with a minimum of nine digits precision. Floating point calculations are done with BCD arithmetic to keep the dollars and cents precision that is important to business programming. The manual indicates that the transcendental functions are generally accurate to seven digits. Whenever possible, numbers are kept as 16 bit integers (primarily to speed up loops and array subscripting).

This is a very complete BASIC with all the features you might expect plus some useful extensions of the "standard" BASIC language. Rather than list all the functions and statements, let's first examine the program development cycle and then look at some of the special features.

## COMPILE VS INTERPRET

Since this is a compiler rather than an interpreter, a somewhat greater discipline is required of the programmer if programs are to be developed efficiently. The development cycle consists of four steps.

(1) Before a program can be compiled, a text editor must be used to create a program source file on a diskette. An excellent editor is available from Software Dynamics but nearly any editor program should be acceptable. More about that later.

(2) The BASIC source file is then compiled using the COM command. The compiler itself runs quickly and has very good error diagnostics. Any error which the compiler detects results in a printout of the line in which the error occurs. A pointer (a caret) points to the problem in the line, and a message describes the error.

(3) The output of the compiler is a text file in an assembly language form. This intermediate form must be assembled using the SD assembler, which is included as part of the compiler package. In the assembly step, any assembly language subroutines may be assembled along with the compiler output. The assembler creates a binary file containing the 6800 object code.

(4) Finally, the binary program is combined with the BASIC run time package and I/O package for execution. This is accomplished by simply typing the command RUN followed by the binary file name.

Compared to the interaction of interpreted BASIC, this procedure may seem like quite a hassle to many programmers. Admittedly, the whole process can be quite frustrating to some of us "quickie" programmers who tend to develop and "improve" programs as we type them into the computer. However, when you consider what this compiler was designed for, the development cycle does not present much of a problem.

Large business and process control programs are carefully designed and checked out on paper long before the programmer sits down to a terminal to enter the source code. Using a compiler such as this one will actually discourage the sloppy habits and error-prone programming style that many of us have grown so fond of. After using the SD BASIC compiler for a while, I found myself making fewer errors the first time around on a program! To help even further, the people at Software Dynamics have added a few things which I found very useful.

#### A LITTLE EXTRA

Two features of SD BASIC which considerably simplify program coding and maintenance also represent a departure from what might be considered standard BASIC syntax. First, line numbers are needed only if a program line is referenced by another part of the program. Since line numbers do not have to be in any particular order, they are used just like statement numbers in a FORTRAN program.

The second feature is the use of multicharacter variable names. Variable names may be any length, with the first fifteen characters distinguishing one variable from another. In my opinion, long variable names do more for enhancing program documentation than anything else. This is especially important for the large business type programs for which this compiler is intended. The programmer (possibly yourself!) who has to modify your program a year from now will appreciate finding variable names such as RECORDLENGTH and CUSTOMERNAME\$ instead of cryptic hints such as R4 or C\$. This compiler could pay for itself in time saved in program maintenance alone!

#### STRINGS AND THINGS

The SD BASIC compiler has good string handling facilities. String variables may contain strings from zero to 65534 bytes in length (limited by the amount of memory in a system, of course).

At first glance, one aspect of the compiler appears to be a serious drawback - string arrays are not supported. However, the unlimited string lengths and the excellent string manipulation functions allow surprising flexibility. Using the powerful substring facilities combined with a few simple calculations, you can do anything with strings in SD BASIC that you can do using a BASIC with single or double dimensioned string arrays.

In addition to all of the "normal" string functions you might expect, such as MID\$, LEFT\$, LEN, etc., other functions are included to make life a little easier. FIND will search for the occurrence of one string within another. HEX\$ works a little differently than the HEX\$ you might be familiar with in TSC's BASIC Interpreters: this one takes an integer argument and returns a string of characters which is the hexadecimal equivalent of the argument. Facilities are also provided for the reverse; that is, constants can appear in any expression in hexadecimal form (great for PEEKing and POKEing).

I found the substring capabilities of the compiler to be very useful. For example, the expression

```
A$(2,5)=B$(10,5)
```

will set five characters (starting with the second character) in A\$ equal to the five characters starting with the tenth character in B\$. Byte manipulations may also be performed using string variables. The expression

```
B$(3)=13
```

will set the third character of B\$ equal to an ASCII carriage return.

I/O manipulations with this compiler are very flexible. Since it is touted as a business BASIC, you would expect to find a PRINT USING statement for output formatting. Software Dynamics complements their PRINT USING statement with an optional FORMAT statement. (More shades of FORTRAN!) The FORMAT statement is useful for defining long or commonly used format strings. Instead of repeating a format string in several different PRINT USING statements, one FORMAT statement can be referenced by its line number. A nice touch!

File I/O can be accomplished using PRINT and INPUT statements to store and retrieve ASCII data. The compiler can also work with binary data using the WRITE and READ statements. Besides increasing the speed of data transfers to and from a device, a programmer can use the binary transfer to easily construct specially formatted files.

Random files are supported, depending on the operating system and the I/O package interface. In the FLEX version, a disk file can be opened as a random access file by including a "RAN:" prefix with the file name as it is created. The design of all of SD's software assumes that files opened on any I/O channel can be written to or read from randomly or sequentially. The designer of the I/O package for a specific computer system must provide for devices for which this does not make sense (such as randomly accessing a paper tape punch, for example). This philosophy is a sound one and is an example of the professionalism evident throughout the SD software.

#### ASSEMBLY LANGUAGE, ANYONE?

For those applications which require an interface between a BASIC program and a set of assembly language subroutines, SD has made the programmer's job an easy one. The link between BASIC and an assembly language subroutine is by way of the name of the subroutine (rather than by an absolute address).

In contrast with the juggling that is often necessary with other BASICs, arguments may easily be passed back and forth between the BASIC program and the assembly routine.

The CALL statement passes a list of arguments to the assembly language routine by means of a value stack pointed to by the 6800 index register. These arguments can be floating point or integer numbers, or pointers to numeric or string variables. The BASIC manual clearly defines the data structures involved, leaving no guesswork. A test program that I wrote actually worked the first time!

#### WHAT ELSE?

Among the other features which SD BASIC supports are error trapping, very complete logical operators and functions, IF-THEN-ELSE, and multiple statements per line. Program CHAINing is made easier with a FORTRAN-like COMMON capability. Program debugging is aided by dynamic trace, single step, and breakpoint facilities. A GOSUB POP statement can adjust the subroutine return address stack - useful for error recovery routines, but watch it!

Since this compiler produces 6800 object code, PROGRAM ORIGIN and DATA ORIGIN statements are included to enable positioning the code to any desired place in the 6800's addressing space. (Provided room is left at the bottom of memory for the runtime package.)

The manual is full of programming examples. even



Including several complete programs for illustration purposes. A demo PAYROLL program provides a good example of floppy disk I/O techniques. For those of us inclined to be less practical, there is an interesting implementation of John Conway's "game" of LIFE.

One aspect of the SD compiler which may take some getting used to is the requirement that all variables (arrays, string and otherwise) must be DIMensioned at the beginning of the program. This is to enable the compiler to allocate space for each variable. The DIM statement doubles as a means of initializing numeric or string variables. This turns out to be not only convenient but necessary since no DATA/READ/RESTORE capabilities are provided for within the BASIC program. This requirement to DIMension all variables at the beginning of the program should be an asset to documentation, especially where large programs are involved.

#### SPEED

A word about execution speed. Although one might expect compiled programs to execute many times faster than interpreted programs, a few tests revealed that SD BASIC is not really a speed demon. The manual claims that execution speed "improvements of up to 60 times have been seen." However, when the manual was written, about the only 6800 interpreter around to compare times with was the notoriously slow (but otherwise excellent) SWTP BASIC. Comparisons with recent advances in interpreter design, notably the Technical Systems Consultants 6800 BASIC and EXTENDED BASIC, might be interesting.

I ran a number of benchmark programs on all three BASICs. It is not really surprising that the TSC 6800 BASIC Interpreter was faster in some cases. The TSC 6800 BASIC carries only six or seven digits of precision, represents its numbers internally in binary form, and is admittedly optimized for speed.

The TSC EXTENDED 6800 BASIC is much more closely matched to the SD BASIC in terms of features and precision. Running a similar set of benchmark programs showed the execution times were closer - sometimes faster, sometimes slower. The TSC EXTENDED BASIC was often faster when explicit integer variable types were used, while floating point calculations and string manipulations were often faster in the SD compiled programs.

How important is execution speed? Although binary arithmetic would have decreased program execution times considerably, the people at Software Dynamics decided that using BCD (Binary Coded Decimal) arithmetic was the best solution. This compiler allows dollar values of up to \$100 million to be represented in pennies. Flexibility in programming and ease of maintenance tend to become more important than shaving seconds as programs increase in complexity. I feel that the SD BASIC compiler combines features such that a good overall balance is obtained. A serious user will definitely not be disappointed.

Is the SD BASIC compiler for you? If your requirements include designing production business programs or process control programs, this compiler was made for you. It has enough features to keep even the hard-core programmer happy. The line numbering variable naming conventions will make a FORTRAN programmer feel right at home. The documentation is well organized and full of examples so little time is wasted due to misinterpretation. And don't forget, compiling a program assures that software can be distributed while the source remains

confidential. This is very important for those with a sizable investment to protect and is something that is difficult and perhaps impossible with an interpreter.

Although the primary interest of this review is the SD BASIC compiler, the Software Dynamics 6800 assembler must also be considered since the assembler is required to assemble the compiler output.

#### \*\*\* SD 6800 ASSEMBLER \*\*\*

The Software Dynamics 6800 Assembler is a two-pass conditional assembler compatible with all source files prepared for use with Motorola standard assemblers. Its use is by no means limited to the intermediate step in a BASIC compilation, though it performs that function flawlessly. It is truly a programmer's assembler with many extensions to provide flexibility and to improve program maintenance.

#### SYMBOLS

Long symbols greatly enhance an assembly language listing, improving readability. This assembler allows symbols to be any length, with the first fifteen characters defining a unique symbol. An extended symbol character set permits symbols to begin with a letter, a colon, or a period. In addition, a symbol may also contain dollar signs, percent signs, and at signs. I am no longer driven to desperation trying to come up with meaningful symbol names.

#### CONDITIONALS

The conditional assembly facilities of the SD Assembler add a new dimension to the professional user's bag of tricks. For those of you who are not familiar with conditional assembly, it simply permits sections of code to be selectively assembled based on the value of certain expressions or symbols. Its primary use is for creating general purpose assembly language source programs that are capable of producing customized executable binary programs.

A good example is the I/O package used with all SD system software. Although the I/O routines for the compiler, the assembler, and the run time package are all somewhat different, they are all produced from the same source program. For example, to create a new I/O package for the compiler, only one line

#### COM EQU 1

must be included at assembly time. The assembler will then automatically include only those source statements that are appropriate for the compiler's I/O package. Isn't that better than trying to keep up with three different versions of the I/O package source program? From the user's point of view, it is much simpler to be able to specify an option than to risk editing a large assembly source file!

The basic conditional structure is a block of code beginning with "IF <expression>" and ending with "FIN". The statements between the IF and the FIN are assembled only if the expression evaluates to greater than zero. Sophisticated structures can be built with the CASE, DO, ELSE, ELSEIF, and IFUND commands. Directives are also included to control the listing of conditionally assembled source lines. The SD Assembler allows nesting conditional assembly commands to 255 levels.

The assembler has an excellent mechanism to allow the user to specify directives and conditional

assembly parameters at assembly time. When started, the assembler enters an immediate input mode, giving the user the option of entering as many assembly source lines as desired. Symbols may be defined for conditional purposes, or listing formats can be modified. This is a great improvement over having to edit the source file just to change one option! A simple program may even be typed in from the console and assembled without ever using an editor program to create a source file. A very useful feature.

#### OPERATORS AND DIRECTIVES

The assembler includes a complete set of arithmetic and logical relational operators (like "greater than" and "not equal") for use with conditional assembly expressions. You will also find an extended set of operators for use in standard assembler expressions. Among the many included are those performing one's complement, modulo, and shift operations.

One point of interest here is the hierarchy involved when the assembler evaluates an expression. The SD assembler follows an extended algebraic hierarchy which can be modified by the use of parentheses. This permits the use of very complex expressions. Since the standard Motorola assembler convention is to evaluate expressions strictly from left to right, source files originally prepared for use with another assembler may not assemble correctly. To maintain compatibility, the SD assembler includes a WITH MCM directive to enable a forced left-to-right evaluation.

In addition to all of the standard directives (EQU, FCB, etc.), directives are provided to control the listing format - things such as subtitles, listing width, and conditional listing. A single line iterative directive and a variable symbol definition directive are also included.

There are so many other features in this assembler that it is impossible to do justice to it in this short space. The manual does a thorough job of covering each aspect. Numerous examples show not only the correct ways but also the incorrect ways of doing things. Overall, it is a pretty impressive piece of software.

#### \*\*\* 6800 EDITOR \*\*\*

The Software Dynamics' text editor program, EDIT, effectively complements the BASIC development package. Although any editor may be used to create source files for the compiler or the assembler, the powerful features of EDIT make it a candidate for serious consideration.

Of course, EDIT has all of those things which by definition make it a disk file editor. You can expect good file handling facilities and the standard commands to search, change, delete, and so forth. Where EDIT surpasses most other editors I've used is in its ability to handle editing macros and to perform complex repetitive editing functions.

Before we take a look at some of these features, a few concepts particular to this editor should be pointed out.

#### CHARACTER ORIENTED

EDIT is a character oriented editor, as opposed to a line oriented editor such as TSC's edit program. Although EDIT does include commands for line editing, the text in the editor's workspace is considered to be one long string of characters. Even control characters (such as carriage returns, tabs, etc.) are handled just as any other character.

A character pointer always points to a particular character in the text buffer. Since editing occurs only at the character pointer, a variety of commands exists for moving the pointer around in the buffer. EDIT is very similar in structure and command syntax to the TECO editor that I have used on large time-sharing computer systems.

If you have never used a character oriented text editor, the "pointer" concept may require shifting a few mental gears. After you get a good picture of what is going on, however, you may find that editing is more flexible and can be done more efficiently than with a line oriented editor.

#### CONDITIONAL EDITING

Increased flexibility always seems to have its price; in an editor program, this usually means a complex command structure. The SD editor is no exception. I counted over forty individual commands, many of which are for performing repetitive and conditional editing functions.

Any command sequence can be repeated by enclosing it within brackets. Simple loops may be created which will repeat a series of commands for a numerical count or until a command fails. More sophisticated editing is also possible using a set of conditional commands. For example, a sequence might test the status of a command, then conditionally branch to a label where command processing would continue. A complete set of relational operators is included for conditional editing.

Value registers are provided for use as counter registers or for storing pointer locations, status information, or even ASCII character values. Arithmetic and logical operators permit numerical calculations.

As if all this wasn't enough, EDIT has built-in macro capabilities. Complete command sequences may be stored in a disk file. Control of the editor may be switched from the keyboard to a disk file at any time, permitting truly automatic editing.

#### WHAT, ME COMPLAIN?

The EDIT manual starts off with a good introduction followed by a description of the more commonly used commands. Enough examples are given so that a beginner can make immediate use of the editor. A reference section (giving detailed descriptions of all editor commands) contains a wealth of information. Although all of the information is available in this reference section, I feel the manual falls short in covering the more complex editing functions. Examples are given, but they are mostly simple ones. Effective use of the value registers and the conditional features of the editor requires quite a bit of digging and a little too much experimentation. A few more examples here would have saved me a lot of time.

The only other thing I can complain about is the use of inhuman error numbers instead of readable error messages. It would be so much nicer to read "ILLEGAL VALUE FOR COMMAND" than to have to look up error number 205 in an error summary table!

Overall, I was impressed with the features of EDIT. It is easy enough for the casual user to operate yet contains enough features to satisfy the most discriminating editor fanatic. Its execution is fast, and it has performed flawlessly for me. At \$110, it is an excellent buy for the professional user.

### \*\*\* IN CONCLUSION \*\*\*

I have attempted to present here an overview of what I consider to be an excellent software package. The people at Software Dynamics have been writing systems software for over ten years, and their experience shows in many areas.

It would have been interesting to review SD's own disk operating system (SDOS) as well, since it appears to be a very sophisticated (Interrupt driven, multi-tasking) operating system. However, due to the interrupt handling of the MIKBUG/SWTBUG ROM's, SDOS will not work with a standard SWTP 6800 computer system. A list of systems that will support SDOS (MSI, EXORcisor, and WAVEMATE, to name a few) is available from SD. Due to the nature of the I/O package, a large variety of floppy and hard disk drives can be supported.

When used with SDOS, advanced versions of the BASIC compiler, assembler, and editor are available. The advanced editor and assembler claim additional features and execution speedups of 2 or 3 times. The advanced BASIC claims size reductions for compiled programs, faster execution, and faster disk operations. In addition, multi-line FUNCTIONS, WHILE-DO-END structures, and many other features are supported.

For detailed descriptions of each of the SD products, I would recommend their very informative software catalog. For those wanting a closer look, the complete manuals are available at a reasonable cost.

### WHAT NEXT?

A 6809 version of SDOS and the advanced BASIC compiler for the SWTP 6809 computer is in the works. It is expected to be ready in late 1980, with versions for Smoke Signal and EXORcisor available a little sooner. I, for one, am anxious to see it.

## THE BIT BUCKET

Where all that 'good stuff' falls.  
Something for everyone.

Mr Don Williams Sr.,  
'68' Micro Journal  
Hixson, Tennessee.

Dear Mr Williams,

I have an old SWTPC 6800 system that I want to upgrade, but I suffer from lack of info. Is the SWTPC 6809 CPU board available in kit form, and what does it cost? What are the basic differences between the /09 and the S/09? It seems that the 128K dynamic memory boards cannot be used in the /09, why? Will it be possible to put more memory in the old mainframe, if and when suitable memory boards become available? (DO power is no problem. I can supply up to one kilowatt of DC)

With my systems primary use in education, level 2 of the new OS-9 should give me the multuser capabilities that I need, but what about Cobol? Unless some sort of Cobol compiler becomes available for the 6809, I will be forced to go the 80XX way - and that probably also means the S-100 bus. Not that I really care about that - it is all a matter of money. I have been pondering these questions for a long time - who puts an end to my worries?

I would also like to learn about how to use the 6809 on the IEEE S-100 bus. Just think what wealth of software I then would be able to choose from! I would like to hear from others interested in the same questions.

Rolf Aalberg  
Rindlerstr 58  
1600 Fredrikstad  
Norway  
June 29, 1980

Sincerely

*Rolf Aalberg*  
Rolf Aalberg

Editors Note: First, yes the SWTPC 6809 CPU card is available in kit form and it sells for \$175.00 (USA). Second, the basic difference between the /09 and the S/09 is that with the S/09 extended addressing is available. This means that the /09 can address upto 64K of memory. The S/09 can address in excess of 800K of memory. Due to the differences in the two motherboards, both physical and logical, more memory and the extended address lines are not on the older mainframes (MPB, MPB2). They can be added by using existing lines (baud rate, etc.) however it requires some knowledge of the system and even more knowledge of other technical aspects.

COBAL is a bear on any small system. I know of NO set or subset of COBAL running on these systems other than for some TVA applications that are not available to the general public. The '80XX way' using COBAL is a disaster and I really do not think you would be pleased. It is sorta like towing a 40 foot boat with a VW Bug.

As for the 6809 on the IEEE S-100(ugh!) bus, well, I will leave that for others to comment on. For myself I know of nothing now.

DMW

ERNEST STEVE WATSON  
11101 ST CHARLES BOULEVARD  
LUTHER FORD, KILLAMORE 70117  
1001-124-1100

April 19, 1980

'68' Micro Journal  
3018 Hewitt Road  
P. O. Box 849  
Hixson, Tennessee 37343

Gentlemen:

I am enclosing for publication a short program in assembly listing which can be used to relocate monitors or utilities. There are no "messages" since this is a "bare bones" program. The program just changes the target binary program to run at the new selected location. The beginning location of the program to be relocated should be entered at \$2C and the last location to be relocated at LAST. As indicated, the program will not handle strings, jump tables or similar non-standard (1.2 or 1 byte instructions and operands) program format. This should not create any serious problem, since most monitors, etc. have their error messages, jump tables, etc. at the end of the program; if so, these items can be relocated manually.

I would not suggest PROMISE this utility, since at least one location (\$2042) will require changing anytime a program is relocated from one location to another. Also the utility is position independent and can be loaded and run in any 80 bytes of continuous memory.

I enjoy your publication and hope you will keep up the good work.

Sincerely,

*Ernest Steve Watson*  
Ernest Steve Watson

NAME RELOCATES SMITHBUG  
\*THIS PROGRAM RELOCATES SMITHBUG  
\*TO RUN AT \$D800-DFFF RATHER THAN  
\*\$F800-DFFF. IT WILL NOT  
\*RELOCATE STRINGS OR JUMP  
\*TABLES, WHICH MUST BE DONE  
\*MANUALLY.

2000	ORG	\$2000
0800	REG	\$800
022C	LAST	\$0E2C
00E3	CONTROL	\$0E3
2000 CE 08 00	LDX	\$8E0
2003 A6 00	NEXT	LDA A 0,X
2005 0C	CLC	
2006 81 1F	CMP A	#81F
2008 25 3E	BCS	AGAIN
200A 81 30	CMP A	#830
200C 25 39	BCS	Twice
200E 81 60	CMP A	#860
2010 25 36	BCS	AGAIN
2012 81 70	CMP A	#870
2014 25 31	BCS	Twice



```

2016 81 80      CNP A #580
2018 25 1E      BCS WORK
201A 81 8C      CNP A #58C
201C 25 29      BCS TWICE
201E 27 18      BEQ WORK
2020 81 8E      CNP A #58E
2022 25 23      BCS TWICE
2024 27 12      BEQ WORK
2026 81 80      CNP A #580
2028 25 1D      BCS TWICE
202A 81 80      CNP A #580
202C 25 0A      BCS WORK
202E 81 8E      CNP A #58E
2030 25 15      BCS TWICE
2032 27 04      BEQ WORK
2034 81 70      CNP A #570
2036 25 07      BCS TWICE
2038 A6 01      WORK LDA A 1,X
203A 81 A0      CNP A #5A0
203C 27 08      BEQ TWICE
203E 81 30      CNP A #5B0
2040 27 04      BLE TWICE
2042 80 20      STB A #520
2044 A7 01      STA A 1,X
2046 08          TRICE INX
2047 08          TWICE INX
2048 08          ACATN INX
2049 8C 08 2C   CPI #LAST
204C 26 B5      BNE NEXT
204E 7E 20 B3   JMP CONTROL
                                END

```

NO ERROR(S) DETECTED

COMPUTERWARE SOFTWARE SERVICES  
SMALL BUSINESS ACCOUNTS RECEIVABLE SYSTEM

Do you know who OWES YOU MONEY and HOW MUCH ????

The Small Business Accounts Receivable System provides reliable and timely information regarding the status of a customer's accounts. You will know who owes you money, how much, and for how long.

The system is easy to use. General information for each customer is entered once. Accounts may be added, changed, or deleted at any time. Pertinent information for each open invoice is entered and maintained in the system until payment is made. Now with a simple report request you can see a particular customer account's current status to know whether to extend or revoke credit - or get a summary of monies expected over aged periods for cash planning - or see which customers need a nudge towards timely payments. Getting a handle on your accounts receivable can mean better control of cash flow!

Information maintained for each customer includes: Account Number, Name, Address, Year-To-Date Invoices, Credit Terms, Credit Limit, Beginning Balance, Current Invoices, and Current Payments. Information maintained for each open invoice includes: Invoice number, date, invoice amount, and payment amount.

The reports available are: Account Cross Reference, Account Master, Account Summary, Account Overdue, Account Aged, and Audit Trails. Reports may be requested at any time and will always show current status as entered into the system. Several sort sequences are provided and a low and high range may be specified for selective reporting.

Users having need for a more extensive Accounts Receivable/Invoicing System should consider our Commercial package which includes complete Invoice/Receipt generation, services billing and more extensive reporting capabilities including sales reports, outstanding invoices and monthly statements.

This system is designed to run on a 40K 6800/6809 computer with a minimum of a dual 5" disk system. SSB DOS and Computerware Random BASIC are required. Versions for other disk operating systems are pending customer demand. Accounts Receivable is available immediately for \$149.

A manual describing the operation & reports of either system is available for \$15.00 from COMPUTERWARE - 1512 Encinitas Blvd. - Box 668 - Encinitas, Calif. 92024 - (714) 436-3512 or 436-0282.

June 6, 1980

Mr. Don Williams  
'68' Micro Journal  
3018 Hamill Road  
Hickson, TN 37343

Dear Don:

In answer to the many questions from your readers concerning switching the GIMIX 6800/6809 mainframe from 6800 to 6809 configurations, the following is a brief explanation of the steps required. As you can see the changes are relatively simple and require no major surgery or permanent changes to the mother board. Of course other configurations are possible and it is not practical to cover this all in this note, but this should cover the majority of questions and applications. If anyone needs further information concerning our products, they can contact us at any time and we will be glad to help them in any way we can.

Very truly yours,  
GIMIX, INC.

By

*Mike Magdos*  
Mike Magdos

MM/JB  
Encl.

RECONFIGURING THE GIMIX 6800/6809 MOTHER BOARD

When switching a system from 6800 to 6809 the four major considerations are I/O addressing, the number of decoded addresses per I/O slot, the baud rate/extended address lines and the system reset connection.

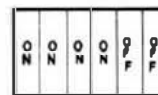
The GIMIX 6800/6809 mother board can be easily switched from one configuration to the other. To change the I/O addressing from 6800 (6800) to 6809 (6809), set sections 3 and 4 of DIP switch S-2 to the off position. The I/O slot size can be left at 4 addresses per slot or changed to 16 addresses per slot by either moving the 74LS244 from socket U-3 to socket U-5 and setting section 3 of DIP-switch 3 ON, or by installing an additional 74LS244 at location U-5 and using DIP switch 3 sections 1 and 3 to switch between 4 and 16 decoded addresses per slot. Most current 6809 software will work with either 4 or 16 addresses by installing the I/O boards in the proper slots. The GIMIX 6800/6809 mother board includes a baud rate generator so the user is free to use the 50 pin baud rate lines for extended addressing if desired. Jumpers are easily installed to connect the baud rate lines of the 50 and 30 pin buses together if the application requires baud rates on the 50 pin bus. The reset line from the front panel reset button can be disconnected from the mother board at the 14 position barrier block and connected to the 6809 CPU reset connector cable.

To switch back to a 6800 configuration, simply reverse the above procedure. The entire procedure to swap between 6800 and 6809 should take about 5 to 10 minutes and does not require any physical modification (trace cutting, etc.) to the mother board.

S-1

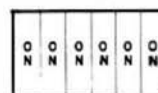


S-2

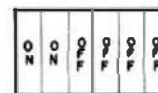


I/O AT \$8000  
6800

S-1

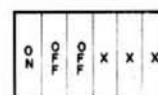


S-2



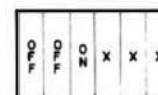
I/O AT \$E000  
6809

S-3



4 DECODED ADDRESS  
74LS244 AT U-3

S-3



16 DECODED ADDRESS  
74LS244 AT U-5

1375 S.W. Bellwood  
Portland OR 97225  
Mar 13, 1980

'68' Micro Journal  
3018 Hamill Road  
P.O. Box 849  
Hickson, TN 37343

Gentlemen:

I am sending you this article as I feel it is very important to the Flex users. The material contained in it has been given to Technical Systems Consultants and they have agreed that it is correct as far as they can check it out at this time. They may publish it in their Newsletter some time in the future but I feel that the users of Flex should get this as soon as possible. I told them that I planned to submit it to you for your consideration and they agreed with me. I have tried to follow your format for submitting articles as best I could and I hope this copy is good enough for your use.

Sincerely yours,

*Wilton Hart*  
Wilton Hart

## FIX ZERO SECTORS (FLEX)

Technical Systems Consultants (T.S.C.) has provided the micro computer world with some of the best software in the industry. It is reasonably priced and works quite well. There are several versions of the software for different disk controller boards and disk drives. I am currently using a SWTP type controller board and Shugart SA400 disk drives.

It is common knowledge that all software worth having still has bugs. The DOS has at least one bug which may show up in several ways for which I have found a fix. It was noted in the "Flex Newsletter no. 3" as a hardware problem. I quote "Several people have experienced and called about a peculiarity in the operation of Flex. It comes about during the writing of a file. The writing of the file is terminated prematurely and subsequent examination of the disk shows zero sectors left in the free chain even though it is known that the disk is not full." They go on to say that it is caused by not correctly finding or reading a link to the next sector during a write so the linked list is broken. The software then gives a zero free sectors indication because it does not know where to put data. I have seen this most often when in the editor but it may happen at other times also. When the NEW command is used to store the current buffer space on the disk and set a new one the write gets terminated long before it should and the disk will have zero free sectors.

I was one of those people who called TSC about the problem and was given the same information as in the newsletter. They also mentioned that they had seen this problem much more often on the 5 1/4" drives than on the 8" drives. Their solution as stated by Dan Vanada was to use the 8" drives. My system did not include an 8" drive so I set out to find

a solution for the 5 1/4" drives. The T.S.C. newsletter included a dump and repair utility. I copied this into my system and found that it did not always work correctly. Sometimes it did not give the data from the track and sector that had been requested. After a closer investigation I found that if the motors on the drives were turning when the command was given, the correct track and sector would be found. If the drives were not turning the chances of getting bad data were around 50 percent. I then strapped the drives on all the time and tried the software without finding any problems. This made me wonder about the start up time required for the 5 1/4" drives. Upon checking the Shugart spec for the drive I found two interesting pieces of information. First there was a 1 sec wait required for the drive to come up to speed before a read or write. The second was that the drive should stop a few seconds after the last disk access. This caused a search for a solution other than leaving the drives on.

Looking through the disk driver section of the T.S.C. manual I found some very interesting information. Two drive status routines are listed with a note to the effect that these were different in 5 1/4" version of Flex. The first routine checks the drive ready bit and waits for 2 seconds if it is not ready. The second routine checks the drive ready bit and returns without a 2 second wait. These routines are not used in the 5 1/4" version. It seems that a routine of this type is still needed to create the 1 second delay.

Before going on to the final solution I would like to explain what I think was happening. On a read the drive appears to work correctly most of the time. This is caused by the retry mechanism built into Flex which will try to read the same sector 28 times before giving up. This can only

happen once every revolution so at 360 rpm that will take about 4.8 seconds which is plenty of time for the drive to come up to speed and find the sector. The same does not necessarily hold for a write. If for some reason the drive is not turning at the correct speed but the electronics thought it found the correct spot for the write the data may get put anywhere on the disk. Sometimes it is in the worst possible spot, over the directory or it may get put out in the free area. The link to the next sector gets destroyed and the software then assigns zero free sectors to that disk. I give the following fix with the thought in mind that it is not the only way to do it or even necessarily the best but it works. For example when editing a 150 sector (Flex 2.0) file I found that I had about 66 percent chance of being able to complete the edit session without having the disk blow up one way or another. After installing the mod I have not had a single disk blow up during about 20-30 hours of editing and assembling done on my system both at home and at work. A one second timer can be added to the disk controller board to hold the ready line low for one second after the motors come on. This is not a good solution as the software does not always check the "not ready" bit in the status register of the 1771 correctly. A better solution is to add a one second software wait before any read or write if the ready line is not high. This can be added to either Flex 2 or Miniflex in unused space. The unused space in Flex 2 is from BFB1 to BFFF. The unused space in Miniflex is from 7EA3 to 7EFF. All disk accesses are initiated by going through a routine located at BF7E in Flex 2 and 7FD8 in Miniflex. By removing one instruction and placing a JSR in its place the time delay can be added. The instruction removed is placed at the end of the delay routine.

The method of making these changes differs for the two systems. In Flex 2 the changes can be added to the Autoblk Program listed in the manual. It is then appended to Flex.cor and linked. The dos should then work correctly. For Miniflex the append will not work as the boot program will not load the appended file. You can make the changes and additions by hand with your monitor and then save from 7080 to 7FFF. The file should then be linked and ready to run. The following program tests the MSB of the status register which is the "not ready" bit and returns to the appropriate read or write if the bit is zero. If not, a one second wait is initiated and then it returns to the appropriate read or write.

```

*THIS IS A 1 SEC DELAY PROGRAM TO FIX FLEX2.
*THE SUGART 5A400 DRIVE REQUIRES A 1 SEC WAIT AFTER THE
*H TOR COMES ON UNTIL THE DRIVE IS ACCESED.
*THIS IS NOT INCLUDED IN THE STANDARD 3 1/4" FLEX.
*
*EQU STATUS EQU 0018 (0018) DISK CONTROLLER STATUS REG.
*
0 7E 0 7E 0 BF 83 ORG 0BF7E (7FD8)
CHK T JSR CHKWT CHECK FOR DRIVE TURNING
*
BFB1 ORG 0BFB1 (7EA3)
BFB1 YMP RMB 2 TEMPORARY STORAGE
BFB3 7D 88 18 TST STATUS IS NOT READY BIT SET
BFB6 2A 13 BPL RETURN NO WAIT NEEDED
BFB8 FF BF 81 STX TMP SAVE X REGISTER
BFB8 36 PSH A SAVE A REGISTER
BFB8 86 7D LDA A #07D LOAD FOR DELAY
BFB8 CE 03 EE LOOP2 LDX #003EE LOAD FOR DELAY
BFC1 09 LOOP1 DEX X-1
BFC2 26 FD BNE LOOP1 IF DELAY1 IS NOT FINISHED GO TO LOOP1
BFC4 4A DEC A A-1 THIS IS SECOND LOOP
BFC5 26 F7 BNE LOOP2 IF DELAY2 IS NOT FINISHED GO TO LOOP2
BFC7 32 PUL A RESTORE A TO ITS ORIGINAL VALUE
BFC8 FE BF 81 LDX TMP RESTORE X TO ITS ORIGINAL VALUE
BFC8 F6 80 19 RETURN LDA 0 STATUS=1 THIS WAS REMOVED FROM THE DOS TO
* MAKE ROOM FOR THE JSR AT 0BF7E
BFC8 39 RTS ROUTINE IS DONE SO GO BACK
*
*****
* THIS SECTION SHOULD BE REMOVED FOR MINIFLEX VERSION
*****
*
*THIS IS THE CONFIG. BLOCK FOR FLEX.COR
*TO USE SET UP AND APPEND TO FLEX.COR
*APPEND FLEX.COR.FILENAME.BIN.FLEX.SYS
*LINK FLEX
*
AD0 EQU 0AD00 DOS KFR ADDRESS
BEA3 ORG 0BEA3
BEA3 E1 AC INVEC FDB 0E1AC INPUT CHARACTER ROUTINE
BEA5 E1 D1 OUTVEC FDB 0E1D1 OUTPUT CHARACTER ROUTINE
BEA7 80 04 ACIA FDB 08004 BASE OF ACIA
BEA9 80 12 TIMER FDB 08012 TIMER BOARD BASE
BEAB A0 00 IRQ FDB 0A000 IRQ VECTOR LOCATION
BEAD A0 12 SWI FDB 0A012 SWI VECTOR LOCATION
BEAF E0 D0 MON FDB 0E0D0 MONITOR ENRY ADDRESS
BEB1 A0 48 PCV FDB 0A048 MONITOR PC LOCATION
ENB XFR
*
NO ERROR(S) DETECTED
*
SYMBOL TABLE:
ACIA BEA7 CHK T BFB3 INVEC BEA3 IRQ BEAB LOOP1 BFC1
LOOP2 BEA5 MON BEAF OUTVEC BEA5 PCV BEB1 RETURN BFCB
STATUS 0018 SWI BEAD TIMER BEA9 T P BFB1 XFR AD00

```



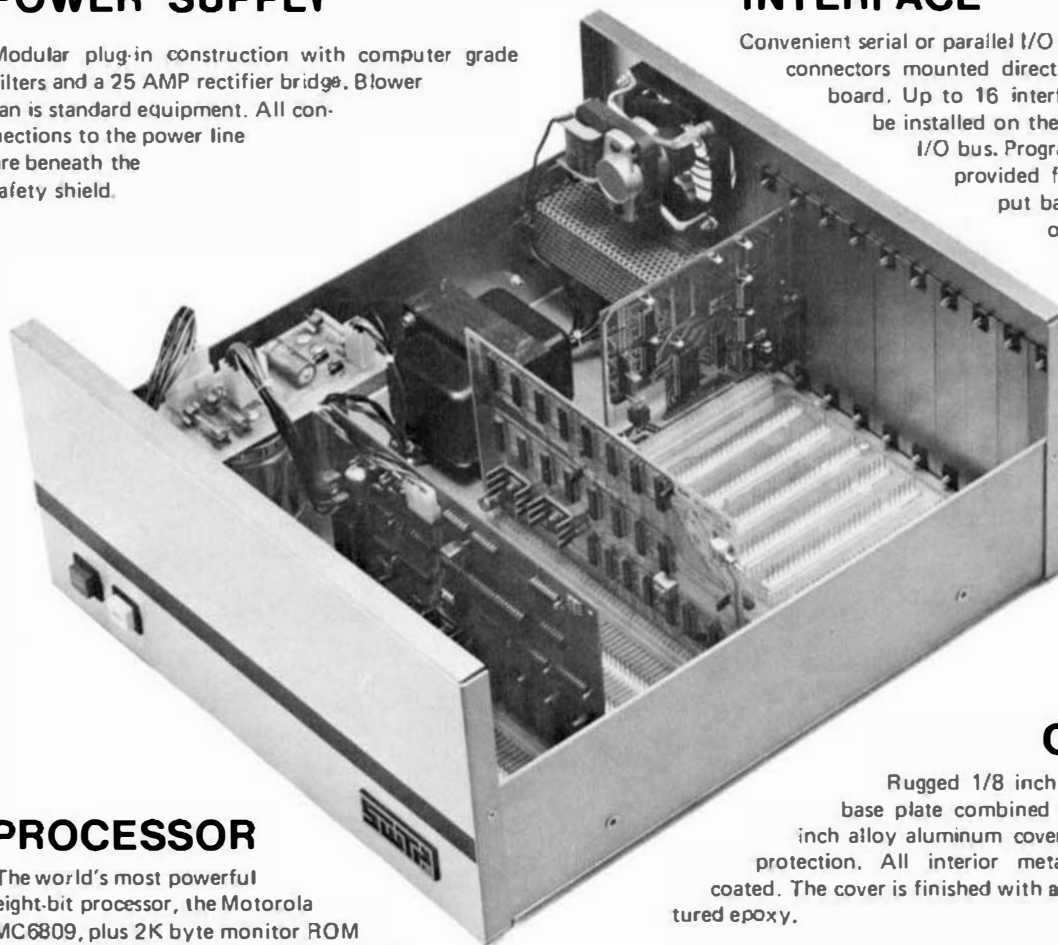
# WE HAVE A 6809 FOR YOU

## POWER SUPPLY

Modular plug-in construction with computer grade filters and a 25 AMP rectifier bridge. Blower fan is standard equipment. All connections to the power line are beneath the safety shield.

## INTERFACE

Convenient serial or parallel I/O cards have DB-25 connectors mounted directly on the circuit board. Up to 16 interface devices may be installed on the address decoded I/O bus. Programming strips are provided for input and output baud rate selection on each port. All outputs are fully buffered.



## PROCESSOR

The world's most powerful eight-bit processor, the Motorola MC6809, plus 2K byte monitor ROM that is 2716 EPROM compatible and full buffering on all output lines. Built-in multiuser capability, just add I/O cards to operate a multi-terminal system.

## CABINET

Rugged 1/8 inch alloy aluminum base plate combined with a solid 1/8 inch alloy aluminum cover for unsurpassed protection. All interior metal is conversion coated. The cover is finished with a super tough textured epoxy.

**MEMORY**— You can purchase the computer with either 8K bytes of RAM memory (expandable to 56K), or with the full 56K. The efficient, cool running dynamic memory used in this system is designed and manufactured for us by "Motorola Memory Systems Inc."

**PERIPHERALS**— The wide range of peripheral hardware that is supported by the 6809 includes: dot matrix printers (both 80 and 132 column), IBM Electronic 50 typewriter, daisy wheel printers, 5-inch floppy disk system, 8-inch floppy disk systems and a 16 megabyte hard disk.

**SOFTWARE**— The amount of software support available for the 6809 is incredible when you consider that it was first introduced in June, 1979. In addition to the FLEX9 operating system, we have a Text Editor, Mnemonic Assembler, Debug, Sort-Merge, BASIC, Extended BASIC, MultiUser BASIC, FORTRAN, PASCAL and PILOT.

69/K Computer Kit with 8K bytes of memory . . . . .	\$ 495.00
69/A Assembled Computer with 8K bytes of memory . . . . .	\$ 595.00
69/56 Assembled Computer with 56K bytes of memory . . . . .	\$1,495.00



SOUTHWEST TECHNICAL PRODUCTS CORPORATION  
219 W. RHAPSODY  
SAN ANTONIO, TEXAS 78216 (512) 344-0241

# 6809 DISK SYSTEMS

All disk systems are supplied with our version of FLEX 9, the world standard disk operating system for the 6809. Our systems normally operate in double density format, but they are compatible with single density, or single sided recording formats. FLEX is supplied with over forty utilities, many of which are only available with our systems.

Our disk systems offer you mass storage at low cost. The cost per thousand bytes of storage for our various systems is shown in the chart. Other 6809 disk systems have costs up to three times greater for the same general type drive.

TYPE	CAPACITY	COST
D-5	720,000 bytes	\$1.80 per/K
DT-5	1,400,000 bytes	\$1.16 per/K
DMF-2	2,400,000 bytes	\$1.04 per/K
CDS-1	16,000,000 bytes	\$ .27 per/K

**D-5** Two double sided, double density, 5" disk drives with a total on line capacity of 720,000 bytes of data. Includes cabinet, power supply, connecting cable and controller. Controller will operate up to four drives. This is an ideal disk system for small stand alone word processing systems, or for businesses that do not work with large inventories.

14 x 6 x 10 — 20 lbs . . . . . \$1,295.00

**DT-5** Double track density version of the D-5. The DT-5 uses two 96 track per inch drives to provide an on line capacity of 1,400,000 bytes. Includes cabinet, power supply, connecting cable and controller. Controller will operate up to four drives. This is a disk system with enough capacity to include small inventories of up to 1,000 items, plus the usual business package of general ledger payroll, etc.

14 x 6 x 10 — 20 lbs . . . . . \$1,695.00

**DMF-2** Double sided, double density, dual eight-inch disk system with an on line capacity of 2,400,000 bytes. Our "top of the line" disk system features a DMA type controller for fastest possible data transfers. This drive was designed for larger businesses and multi user installations. The DMF-2 will provide the fast operation necessary for systems running multiterminals under the UniFLEX operating system. Complete with a heavy duty 1/8-inch metal cabinet, power supply, connecting cable and controller. The controller will operate up to four drives.

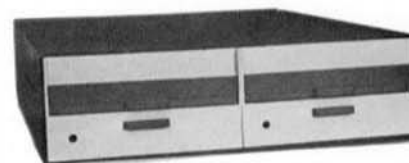
17½ x 5 x 21½ — 53 lbs . . . . . \$2,495.00

**CDS-1** This "Winchester" type hard disk provides both large storage capacity and high speed operation. The CDS-1 is the answer for systems that must handle large inventories or systems with more than four terminals. The controller has its own processor and uses DMA data transfer.

CDS-1 — 115 lbs . . . . . \$4,395.00



D-5 or DT-5



DMF2



CDS-1



**SOUTHWEST TECHNICAL PRODUCTS CORPORATION**  
219 W. RHAPSODY  
SAN ANTONIO, TEXAS 78216 (512) 344-0241

## Dear Don, OS9-BASIC09 (MICROWARE)

The latest news; I have a preliminary copy of OS9-1 (trademark of Motorola & Microware) up and running along with a copy of BASIC09 (trademark of Motorola). The flyers and ads for this don't begin to cover the power available to the user.

OS9-1 will allow full interchange between peripherals (in any direction). This means terminal to terminal, disk to disk, disk to printer, tape to disk, and with the proper device driver, even all of the above to the kitchen sink. OS9-1 also manages the RAM and other resources on your machine, allocating space and recovering it when jobs are done. This is a very critical item that allows the freedom to run as many tasks as you have room for AT THE SAME TIME. It normally would use an interrupt timer for house keeping and time keeping for switching tasks but in my case I did not have one in the box and it used the I/O interrupts to manage the tasks!!! When a task is complete, it returns the resources to the operating system which leaves that space free to do something else (including queued background tasks). The ultimate demonstration of this "single user" operating system is to have BASIC09 in the machine running as both background and foreground tasks with several users on the mainframe! Everybody has access to the disk and all other resources. WARNING- This is habit forming. WARNING- It is very tough to get at my machine now because everyone wants to play with the "single user" operating system and see just how far they can push it. Needless to say I ran out of terminals first.

BASIC09 is just as impressive. I am not sure it should be called BASIC because it appears to accept almost any type of source programme with only

minor variations. Kilobaud benchmark #7 on 1mhz cpu all floating point numbers, runs in 17 seconds. With the counter set to an integer number and the index in the loop set to integer it runs in 8 SECONDS!!! If your CPU is 2mhz this is 4 seconds!!! It does not need line numbers unless you reference them and if you write totally structured programmes you can leave them off altogether!!! This basic will lend itself to business programmes very well. Just imagine being able to update your general ledger (as a background task) while you are printing payroll (another background) and entering new data!!! Can you imagine trying to play chess with this and the machine is working on its next probable moves while you are trying to make yours??? BASIC09 will access the operating system from keyboard or programme, so this lets you do house keeping chores also (perhaps a special disk copy routine that filters out certain items from the copy?).

What's missing??? Nothing except "DEF FNA". That was replaced by; "RUN EXT". The EXT can be any procedure name and that procedure can be passed any data by the calling routine and can be as complicated as needed. It can be a complete programme itself! This is good for doing ugly math, but it is GREAT if you want to define a STRING function. Even define a type of printing routine!!

All programmes are called 'procedures'. A user can have many procedures resident in the machine at one time, and he can save them ALL under one file name on mass storage. A user can save the source code OR save the 'I' code, which means smaller tighter programmes and the ability to hand it out for test and it can't be listed!

DATA definitions are; boolean, byte, integer, real and



string. Strings can be forced to any length and arrays get very small when you make them integer or byte. Arrays can be 3 dimensions (strings too), and can be used in complex data types by name. By the way, I can use variable names up to 255 characters long and ALL the characters count, not just the first few. A real review will follow if you want it.

MORE NEWS; I just received my GIMIX preliminary 6809 SYSTEM and it sure is a beauty. I can only say that when I had trouble with another system, the easiest thing to do was to change the configuration of the GIMIX card to match the system in test and I had a replacement I could count on! There are a lot of jumpers on this and the four ROM sockets can be set for 1K to 8K parts (single or triple voltage, ROM or RAM). I got mine with the GIMIX super DAT on it, but that can be shuffled to look like anyone's DAT. Also timers, battery, CMOS ram, provision for clock and math chip.

Still more; DCB-4 board has now been installed in just about every combination of CPU and box available. 6800 and 6809, works fine here! This allows full interrupts while working the disk as the board buffers the data to the disk. Better yet, it allows single/double density on most any kind of disk drive. Will also handle four 5 inch drives AND four 8 inch drives. Will allow 35 or 40 tracks on 5 inch drives and normal or double track density! That means 730+K on a 5 inch diskette!

More news next week. See you at the show.

Regards,  
Tom

Tom Hannon  
TOM Enterprises  
Box 493  
Laurel, MD 20810

## TAPE & THE HOBBYIST

The marvelous thing about a computer is its likeness to clay - add a little imagination fired by purpose and amazing things begin to happen. The size of the machine doesn't really matter, its what you make of what you have that really counts. To a hobbyist, a machine can grow without rhyme or reason or not at all and still fulfill its purpose. It does not need a "practical" use (business, etc.), nor, unless he has a wife, does he really need an "application" to justify its existence. Small systems can be allowed to be "just a small system."

At least this is the feeling I saw reflected in most of the letters I received from individuals who took the time to answer my "A Hobbyist Speaks out" article. I did not really expect much of a response, and certainly did not foresee the creation of a column in this magazine brought about by the response to that short commentary. But strange things do happen, particularly around computers, and so it comes to pass that this experimental column has come about.

For this august occasion, I thought the readers would like to hear what some had to say.

The letters I received were quite interesting and expressed a wide range of topics on which the writers desired to vent some spleen. Particularly popular subjects included this magazine, small systems in general, users groups, tape standards, and some individual suggestions. Over all, most were ardent hobbyists and viewed expansion with the "wait until its cheaper and the bugs worked out" kind of shrewdness that has resulted in smaller, but better home fantasy machines. At any rate, here are some of the comments that space will allow:

Raymond Cesneuf: "I am interested in a program interchange."

Erwin Schmerling: "I am sure that other hobbyists have developed useful routines and patches, and would welcome a user group for the 6800 and CFM/3 combination."

R. Naud: "If we could get a list out, maybe we would exchange used equipment at a fair price?"

Speaking of exchange - our European friends can really use some opportunities in "fair priced" exchanges:

Peter Bendall: "Computer systems cost about 60 percent more in (West) Germany than in U.S. . . a 32K Gimix with 2 minifloppies runs about 12k D-marks, around \$7k, thanks to airfreight and dealer profits."

Paul Verburg: "Its very difficult to (obtain) parts here in Holland, there is only one shop that deals in SS-50 Buss, and he takes advantage of that, for instance; I bought an 8k memory board of SWTP, . . . one kit and it cost about \$425."

A "Trading Post" and "Information/Parts exchange" sound like great ideas. If people are interested, I will bring it up with Don.

Small systems: Almost all described their systems (see following directory), but some divulged their feelings about them - some good, some bad, but typical hobbyist:

Jeffrey Craig: "I have been somewhat disappointed at the lack of variety in the software available. I have been told how powerful the system I have is and yet it is being left largely unrealized - in my opinion."

Dennis Doonan: "The more I think of it, I wonder if there really is a system too small. These 'Blasted' machines can do so much

if you just think through a problem. . . time is not that important when it is measured in seconds."

Erwin Schmerling: "I believe that this can meet my needs for a long time without the need to invest in floppy disks or more advanced processor chips. Booting up from a cold start, I can load a KC read tape (With) the CFM/3 software (4800 Baud) and an 8k Basic in 1 3/4 minutes."

Dennis Doonan: "Most people never begin to realize the power they currently have. There is still so much that the 6800 can do that we have yet to realize. . . With the 68000 due by the end of the year, we are sure to see the 6809 users abandon their CPU's for the latest new and improved products. It reminds me of the new car market of a few years ago."

Users Groups: On this topic there were several supportive comments. Most favored the idea of a "confederacy" of small users that interacted with one another through this magazine in software/hardware forums, trading posts and spleen venting articles. There is an advantage to this. Clubs could still maintain their identities while yet contributing to the forums for the common good. In each letter I answered, I encouraged the writer to submit their favorite patches, anecdotes,

Concerning '68' Microjournal, feelings were sometimes painfully to the point:

William Bann: "'68' Microjournal is the slickest magazine since buttered popcorn in my opinion. . . but . . . not many articles hit home for me."

Neal Champion: "The implication was that every article could be read without the sorting required for a mix of processor chips. I don't bother to do more than skip through it now. . . This

latest issue is a demo of why: disc, TSC, business(!), etc. . . I thought the 6800 was going to have a dandy software forum; now it appears aimed primarily at hardware, or at least software to make the hardware work right. My 6800 works already, . . .!

Not all was despair, many good suggestions were supplied with the criticism:

Dennis Doonan: "Give a list of small problems/projects that the readers could solve. Many people just do not realize the small routine they wrote for their system could be more useful to someone else. . . let people know what the little problems are and I'm sure you will get solutions."

fr. Peter Ricke: "QST, the Journal of the American Radio Relay League, is a model for catering to different areas and different levels of interest. The Micro magazines would do well to study it." hardware projects, etc, to the magazine. It is not hard, and you certainly do not need the poetic expression of Longfellow. The rewards are great. Not only do you "meet" many great people who respond to your projects, but some munchkin struggling desperately to solve a problem may actually find THE ANSWER through your offering. Those who have club experience know that unless there is participation by members, things rapidly go downhill.

Charles Worstell: "I do not feel the users group is a success because of lack of contributions of articles . . . or even feedback on what the members want."

The same can be said for the magazines; without support from clubs and individuals, the magazine must turn elsewhere to stay alive.

If there is a response, Neal Champion proposes this control: "Anyone with a disk or more than 32K, or any chip other than the 6800 would be allowed to correspond only when the letter is approved by someone who still has a buggywhip"! Perhaps a bit more forgiveness is in order, but business and multi-disk systems are not, at this time, on the average budget of most hobbyists. Whatever size system you might have, if you bltfiddle in a way that small users can take advantage of, by all means submit a small write-up on it. I am sure someone would like to see it.

In putting this admittedly lengthy article together, I wanted to write something profound that gave a statement on the essence of hobby computing (other than the kind expressed when that blue smoke appears) but my vocabulary isn't that big. However, I believe Lynn Barton rescued the effort nicely: "This system does not have the speed, capabilities, on-line storage capacity, or print quality that most people rightly expect of a computer system. It is not bus-compatible with anything else, and any 'foreign' software has to be rewritten to some extent in order to run on my system. But the cost was within my budget, and it has many practical uses. But best of all was the fantastic learning experience of creating a computer with my own hands."

NEXT TIME: A New Tape Standard - JPC at 4800 baud?

I'd like your comments about this, or any, article for small systems. Send them to:

Mark Libby  
3923 Lynncrest Dr.  
Cleveland, TN 37311



## DIRECTORY

WILLIAM BANN  
 USS MIDWAY CV-41  
 OW Division  
 FPO SFRAN, CA 96631  
 SWTPC 6800 32K  
 JPC/CFM-3 Tape  
 PMB-1 Video Board  
 Needs a "Decent" Basic, has  
 the documentation for SWTP 2.3,  
 but they sent him the wrong  
 program.

LYNN BARTON  
 P. O. Box 9538  
 Glendale, CA 91206  
 Single Bd 6800  
 32K dynamic RAM  
 TTY/ASCII keybd  
 Centronics Microprinter  
 Video Monitor

PETER BENDALL  
 Flottmooring 67  
 D-2358 Kaltenkirchen  
 West Germany  
 Tel: +49 4191 6538  
 "Newbear 77-68" 6800 48K  
 "Cottis-Blandford" Tape  
 TC3/CFM-3 Tape  
 Video Display  
 40 Column Printer  
 Peter is part of the "77-68"  
 club in Germany and welcomes  
 dialogue with people in the US.  
 He would also like recom-  
 mendations on a good FORTRAN for  
 small systems. The "77-68" club  
 has 500+ members and an extensive  
 library. Peter also offers his  
 help to anyone who is "coming  
 this way" and needs help with the  
 language and maps. He is also a  
 ham (DJ0JR).

RAYMOND CESNEUF  
 Berliner Str .54  
 6457 Maintal 1  
 West Germany  
 SWTPC 6800 24K  
 JPC tape  
 ADDS Terminal & ASR 33  
 Interested in program interchange.

NEAL CHAMPION  
 602 Copper Basin Rd.  
 Space 27  
 Prescott, AZ 86301  
 SWTP 6800 16K  
 JPC/CFM-3 Tape  
 Model 43 TTY & SWTPC CT-1024

NORMAN COMOMO  
 3 Pryor Rd.  
 Natick, MA 01760  
 SWTPC 6800 32K  
 JPC/CFM-3 Tape  
 Interested in developing a new  
 tape standard. His proposal will  
 be part of the next "Hobbyist"  
 column.

JEFFREY M. CRAIG  
 Apt 912  
 3001 S. King Dr.  
 Chicago, IL 60616  
 SWTP 6800 32K  
 AC-30 Tape  
 SWTP CT-64 & A. J. Terminal

DENNIS DOONAN  
 345 Main St.  
 Racine, WI 53403  
 SWTPC 6800  
 Percom LFD-400 disk

GEORGE KELM  
 P.O. Box 160  
 Yap, Caroline Is, TT 96943  
 Heath 3400 with 6800  
 Processor chip.  
 H-19 terminal (soon)  
 George would like to hear from  
 someone with a similar system or  
 anyone who is familiar with such  
 a system. He has an extensive  
 electronics background, but is  
 just getting into this hobby.

BOB LEVINE  
 32 King St.  
 New York, NY 10014  
 Thomas Ins. 6800 & Video Bd.  
 DSD Video Board  
 JPC Tape  
 Selectric I/O Terminal

R. NAUD  
 506 Cameron  
 Windsor Ontario  
 Canada, N94 147  
 SWTPC 6800 16K  
 F&D Video Board  
 JPC Tape  
 Interested in used equipment  
 interchange.

fr. PETER RICKE, ofm  
 St. Francis Cathedral  
 P.O. Box 2127  
 Santa Fe, NM 87501  
 SWTPC 6800 20K  
 CT-64, CT-VM  
 AC-30 Tape  
 PR-40 printer  
 fr. Peter is also a Ham and  
 will soon be back on the air  
 after a recent move. He is  
 interested in a "modest"  
 sort-merge program that prints  
 names and page numbers if anyone  
 has one and would like to send  
 him a copy.

ERWIN SCHMERLING  
 9917 La Duke Dr.  
 Kensington, MD 20795  
 SWTPC 6800/2  
 CT-64  
 AC-30/JPC/CFM-3 Tape  
 Interested in a tape file  
 handler that would emulate a  
 small disk system using the JPC  
 tape interface. Also would like  
 to contact someone who has used a  
 telephone modem to a PDP-11,  
 developed better curser control  
 to a CT-64, Speeded up the CT-64  
 response to the computer and/or  
 developed a small system  
 data-based management system  
 (Tape oriented).

PAUL VERBURG  
 Joh. Camphuysstraat 107  
 2593 CK Den Haag,  
 Holland  
 SWTPC 6800 24K  
 AC-30 Tape  
 CT-64  
 Has problem getting parts and  
 information at a reasonable cost.  
 Would like to communicate with  
 other system users.

CHARLES C. WORSTELL  
 36012 Military Rd. S.  
 Auburn, WA 98002  
 6800 EVK-2  
 RO-28 TTY  
 Going to SS-50 Buss. Looking  
 for better and less expensive  
 software and kits (aren't we  
 all?!).

EDWARD ZIBULKA  
 6515 Kenview Dr.  
 Cincinnati, Ohio 45243  
 SWTPC 6800 26K  
 AC-30 Tape  
 TVT-2 for modem work  
 2 ASR 33s, 1 KSR 33  
 Trustee of TRUSCCC Midwest  
 Affiliated Computer Clubs (MACC).  
 On Micronet and uses Newuser and  
 TRUSCCC on Infoplex. Ed is also  
 a Ham (W8AWK).

Please forgive me if there  
 are errors in this listing that  
 you cannot live with. If there  
 is, Please write and I will put  
 in a correction.

The purpose of this listing  
 is to get people of common  
 interests together. Anyone can  
 be put on it by merely sending me  
 your name, address, system  
 description and interests/  
 problems on a postcard or letter.  
 I would also like to hear from  
 clubs who would like to be added  
 to the list, though I would  
 prefer that this directory be not  
 used so much as an instrument for  
 proselyting as a people to people  
 communication center.

Mark Libby

'68' Micro Journal  
 3018 Hensill Road  
 P.O. Box 849  
 Hixson, Tennessee 37343

Dear Don:

As a proud owner of a brand new X'68 SWTP floppy, I am busy  
 converting my software to take advantage of the Mini-Flex DOS.  
 During this process I come up with a quickie to share. In most  
 of my BASIC programs I have a subroutine that looks like

```
10 PRINT CHR$(16);CHR$(22);
20 RETURN
```

which clears the CT-1024 display screen.

This routine still clears the screen, but the current line number  
 counter in the DOS loses track. I have therefore modified the  
 subroutine as follows:

```
10 PRINT CHR$(16);CHR$(22);
15 POKE (28827,1)
20 RETURN
```

This modification resets the 005 line counter to line 005 when the display is cleared. Of course, the PAUSE must be ON and the WIDTH and DEPTH properly set under TTYSET. The BASIC line numbers are shown in my example for clarity and can be changed to any contiguous sequential set or the entire sequence of instructions can be put on one line.

Your Journal keeps getting better every month.

*R. A. Marke*  
R. A. Marke  
794 Allison Way  
Sunnyvale, CA 94087

```

PEN      CONVERT.TXT
REM      Gene Embry
REM      Route 1 Box 151-M
REM      Morrisville, NC 27550

REM THE PROBLEM:  SSB's EDITOR will not handle
REM               the TAB (09) in the I/O package used
REM               to drive SOFTWARE DYNAMICS's Basic
REM               Compiler.

REM A SOLUTION:   Read the present I/O source program,
REM               byte by byte, and convert to a new
REM               source but changing all 09's to 020
REM               on the fly!
REM               This will allow you to re-configure
REM               the I/O package for different hardware.
REM               Since there is only about 38K bytes in
REM               the I/O package you'll be done
REM               in a very few minutes.

DIM LINE$113
DIM TAB$/:9/
DIM SPACE$/:20/
DIM OLD$/:1:RSD10.20"/
DIM NEW$/:1:RSD10.30"/
REM      This will initialize
REM      OPEN #1:OLD$
REM      CREATE #2:NEW$

I REM THE BEGINNING OF THE LOOP
READ #1:LINE$
IF EOF(1) THEN 10000 I Am we done?
IF LINE$=TAB$ THEN LINE$=SPACE$
PRINT LINE$/: I Display a line on the monitor
WRITE #2:LINE$/: I Write a byte
GOTO 1

REM      THE END
10000 CLOSE #1:#2
STOP
END

A useful technique you may use in your
Basic source programs is to add comments at the end
of the program. Just make sure it is following the END.
No problems during compiling since the END statement is
the end.

```

WISS SCHOOL OF NATURAL SCIENCES  
RICE UNIVERSITY

HOUSTON, TEXAS

INFORMATION SERVICES  
SUN MICROSYSTEMS  
SUN MICROSYSTEMS

29 April 1980

Don Williams  
68 Micro Journal  
P. O. Box 849  
Hixson, TN 37343

Dear Don:

The May issue of '68' Micro Journal contained some helpful information by various authors concerning using MPI 151 and Sugart SA400 drives. I was especially interested in Bill Vodal's observation that he could run his SA400 drives at a 20 ms stepping rate. I did some comparisons of a 6800 system with a SSB 8FD-68A controller and two MPI151 drives (5 ms stepping rate) and 6800 system with a SKTP OC-1 controller and two SA400 drives. I found the following timing comparisons interesting and expect others might find them so also:

Stepping Rate	Load X BASIC (75 sequential sectors)	MEMOISK (35 tracks)	EXEC a command file
SSB/MSI	5 ms	24 s	7 s
SWTP/SA	40 ms	18 s	12 s
SWTP/SA	20 ms	18 s	8 s

the command file was my STARTUP which consists of TTYSET, DP = 20, WD = 82:  
ASM M = 1: ASM.

The conclusion is that for most purposes the stepping time is not a very important consideration; it might be important for a program doing appreciable amounts of random disk I/O. Clearly in a simple load or the type of simple read and writes done in the MEMOISK operation, the disk/memory transfer speed

is the most important consideration. The LEX drivers for the SKTP controller and/or the hardware is faster than the SSB version (Note: neither is the latest version produced by the two companies).

Yours,

*Ray Talbot*  
Raymond J. Talbot, Jr.  
Associate Professor  
Space Physics & Astronomy

## HELP

GENTLEMEN,

I HAVE FINALLY RECEIVED MY FIRST COPY OF YOUR MAGAZINE. I WAS HOPEING YOU WOULD HAVE A COLUMN JUST FOR US BEGINNERS WHO DON'T HAVE EXPERIENCE OR LARGE EXPENSIVE SYSTEMS. MY SYSTEM HAS LESS THAN 4K RAM.

I NEED SOME INFORMATION ON THE PIN OUT FOR THE DIFFERENT CONNECTOR SYSTEMS. THE C.R.E.I. COURSE DROPS YOU OFF WITHOUT TELLING WHAT'S WHAT OR WHERE TO FIND IT OUT. BASICLY I NEED TO KNOW THE PIN CONNECTIONS.

I WILL BE SENDING YOU A CHANGE OF ADDRESS IN OCT. I WILL BE ROTATING BACK TO THE STATES. I WILL BE STATIONED AT SUNNYVALE A.F.S. IN THE FUTURE I MIGHT EVEN GET TO MEET SOME OF YOU AT ONE OF THE SHOWS.

IF YOU CAN'T HELP ME COULD YOU GIVE ME A CONTACT OR REFERENCE SOURCE. THERE IS NOTHING HERE TO HELP. THE LOCAL COMPUTER CLUB IS COMPRISED OF ALL 80 FAMILY COMPUTERS.

TSGT LYSLE E SHIELDS JR., PSC 2, BOX 13552, APO SAN FRANCISCO, CA 96311,

\*\*\*

IS THERE ANYONE OUT THERE IN 6800 LAND WHO HAS USED THE HEATH ET-3400 TRAINER AS A CPU CARD IN A HOMEBREW MAINFRAME? IF SO, I'D BE INTERESTED IN HEARING FROM YOU, AND BE WILLING TO PAY REASONABLE COPYING COSTS FOR ANY SCHEMATICS, PLANS, ETC. PLEASE NOTE THAT WE ARE US PO RATES, SAME AS HAWAII & GUAM.

GEORGE KELM, PO BOX 160, YAP, CAROLINE IS, TT 96943

\*\*\*

ADVENTURE ADDICT NEEDS HELP!!! HAS ANYONE SET THE NOW FAMOUS "ADVENTURE" GAME TO 6800 CODE? IF SO WILL YOU SHARE IT? PLEASE WRITE:

PAUL E PHELPS, 111 DIVISION ST 19, KING CITY, CA 93930,

\*\*\*

I AM DESPERATELY SEARCHING FOR A COPY OF THE MANUAL FOR THE 68KSC 8K RAM BOARD PRODUCED BY SEALS ELECTRONICS. I ORDERED A MANUAL FROM SEALS IN JULY OF 1979. SIX MONTHS AFTER MY ORDER, AND TWO ASSURANCES OVER THE PHONE THAT THE MANUAL WAS BEING SHIPPED, I FIND THAT SEALS IS NOW DEFUNCT. I WANT A COPY OF THAT MANUAL AND WILL GLADLY PAY YOU OR ANY 68' MICRO READER FOR IT. PLEASE HELP!!!

ANTHONY D CHATE, 1818 WOODBOURNE AVE, LOUISVILLE KY 40205

\*\*\*

## CLASSIFIED ADVERTISING

SWTP MP-F CPU CABINET, MP-B, PWR SUPPLY, FAN, PWR/RESET, \$40. YOU SHIP. BOARDS 1 MP-C, \$20. 2CT-CA, \$10 EACH. JOHN DEAL, 1235 MILANO, NAPLES FL 33940, (813)261-0536.

\*\*\*

FOUR SWTP 4K MEMORY BOARDS, LP CHIPS, 3 W/SOCKETS, \$40 EACH. JOHN DEAL, 1235 MILANO, NAPLES FL 33940, (813)261-0536.

\*\*\*

COMPLETE SWTPC COMPUTER SYSTEM WITH EXTENSIVE COMMERCIAL SOFTWARE, MODEL 43 PRINTER, SELECTRIX, SWTPC CRT, DMAF2 DUAL 8" DRIVES AND MORE, WILL SELL FOR \$8000, NENAD DOWNING T.V.A. 615 755 2521

\*\*\*

MSI 6800, 32K, 2 SIEMENS 300K FLOPPYS, CENTRONIX 306, BEEHIVE B100, SOBASIC COMPILER. 6809 FLEX UPGRADABLE. BEST OFFER ALL OR PART-MUST SELL. GARY PATRICK. 4110 CLARK 1, KANSAS CITY, MO. 64111 PH. 1-816-7532293.

\*\*\*



SS50 16K DSD BARE BOARD WITH ALL PARTS LESS 2114'S \$60 OR BEST OFFER. T.CARTWRIGHT, BOX 821, CANDO NO 58324 TEL. 701-968-4525.

\*\*\*

CT-64 TERMINAL \$250, 2 4K MEMORY CARDS \$50 EACH. RUDOLF WILLIAMS, VC-7 NAS MIRAMAR, SAN DIEGO CA. 92145

\*\*\*

SWTP 4K STATIC MEMORIES \$70 EACH, EXCELLENT CONDITION, NEW 74500 IC'S \$0.20 EACH. RANDY KRON, RT. 2, KALONA IOWA 52247

\*\*\*

SS50 16K DSD MEMORY ASSEMBLED TESTED NEW \$250 OR BEST OFFER. T.CARTWRIGHT, BOX 821, CANDO ND 58324 TEL. 701-968-4525

\*\*\*

SWTP 6800; 20K; AC-30; CT-1024. ACCEPT REASONABLE OFFER. ROSS STUARD, ROUTE 1, BOX 147, MANSFIELD TX 76063

\*\*\*

ONE GIMIX COMPUTER NEARLY NEW, EXCELLENT CONDITION, 6800 CPU CARD, 16K STATIC MEMORY CARD (GIMIX). \$800 PAUL LAMAR 123 S JUANITA ST., REDONDO BEACH CA. 90277 WORK (213) 374-1673 HOME (213) 316-8351

\*\*\*

SMOKE SIGNAL BROADCASTING DISK CONTROLLER CARD, WITH THE FOLLOWING SOFTWARE: ON 8" FLOPPY DISK, TEXT EDITING SYSTEMS DISK FILE BASIC AND MNEMONIC ASSEMBLER. \$250 PAUL LAMAR 123 S JUANITA ST. REDONDO BEACH CA. WORK (213) 374-1673, HOME (213) 316-8351

\*\*\*

SWTP 6809 COMPUTER, 36K, MF-68, TSC SOFTWARE, CT64 AND MONITOR; ALSO AC30, MP-C, 6800 CPU CARD. TOM (216)-265-5178 WEEKDAYS BEFORE 3 P.M.

SWTPC 6800 COMPLETE SYSTEM INCLUDING, 24K, EPROM PROGRAMMER, CT-64, CFM-3, TSC BASIC, MUCH MORE, VERY REASONABLE, CALL 203-847-9000

\*\*\*

DISK FILES TO TAPE FOR CHEAP STORAGE-\$5. FOR DETAILS, WRITE JOHN BRADY, 7729 BRADLEY, LITTLE ROCK AR 72209

\*\*\*

### COMPUTER SYSTEMS CONSULTANTS INC.

#### HARDWARE

RS-232/TTL TO SELECTRIC INTERFACE BOARD	\$35.00
SS-50 WIRE-WRAP BOARD (52-16 PIN POSITIONS)	\$25.00
SS-30 UNIVERSAL I/O WIRE-WRAP BOARD (32-16 PIN POSITIONS)	\$12.50
SS-30 SERIAL INTERFACE BOARD	\$10.00
SS-50 FRONT PANEL DISPLAY BOARD (16 LED'S DISPLAY FIRST DIGIT OF ADDRESS)	\$15.00

RS-232 25 WIRE CABLE W/CONNECTORS 8 FT. LONG	\$20.00
34 WIRE 2 DRIVE W/CONNECTORS 8 FT. DISK CABLE	\$30.00
50 WIRE 2 DRIVE W/CONNECTORS 8 FT. DISK CABLE	\$39.00

CABINET FOR DUAL 5" MINIFLOPPIES AND POWER SUPPLY	\$40.00
--	---------

#### SOFTWARE

6800/6801/6809 PROGRAM DEVELOPMENT SYSTEM \$50.00  
(LIMITED TIME ONLY  
SET. INCLUDES FOLLOWING PROGRAMS:

DISASSEMBLER (DISK-TO-DISK, WITH LABELS, FCB'S,  
FCC'S, FDB'S, ETC.).

CROSS-REFERENCE (680X ASSEMBLER SOURCE,  
ALPHABETIZED REFERENCE LIST),

NAME-CHANGER (ANY TEXT FILE, DISK-TO-DISK).

SUPER-ZAP (BINARY FILE EDITOR, DISK-TO-DISK, FULL  
SCREEN EDIT AND INSTRUCTION DISPLAY)

FULL-SCREEN DISPLAY PACKAGE FOR DUMB  
TERMINALS \$25.00

(SET OF TSC EXTENDED BASIC SUBROUTINES TO ALLOW  
FULL-SCREEN DISPLAY/EDIT ON DUMB TERMINALS)

DISK SORT/MERGE GENERATOR PROGRAM \$25.00  
(INTERACTIVELY GENERATES TSC EXTENDED BASIC  
PROGRAM OR SUBROUTINES FOR DISK SORT/MERGE)

1454 LATTA LANE, N.W.  
CONYERS, GEORGIA, 30207  
TELEPHONE 404-483-4570

## DATA BASE MANAGEMENT SYSTEM

The Universal Data Research Data Base Management System provides the user and programmer, with a highly structured and efficient method of programming and data file handling.

The System consists of a Menu of programs to **Create, Build, Sort and Maintain Data Files, Generate Reports and Build User Programs.** All programs are written in TSC Extended Basic.

Included are Source Programs which contain all the common subroutines necessary for reliable, efficient programming for most applications.

UDRI also has a complete line of Data Base compatible end user programs such as:

- Order Entry/Accounts Receivable/Journal
- Purchase Order/Accounts Payable/History file
- Inventory Control/Bill of material
- Payroll
- Cash Disbursement/Cash Receipts
- Customer and Vendor Programs
- Numerous vertical market programs

The Data Base Management System allows the user to quickly modify and update the standard systems programs to fit Custom applications.

Introductory Price: \$350.00

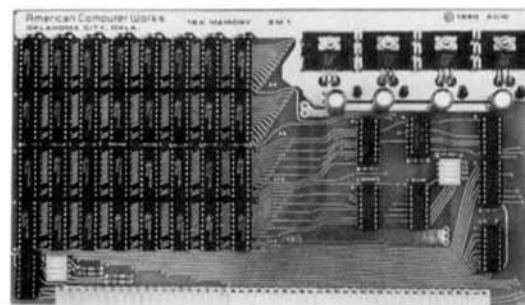
NY residents  
add sales tax

### UNIVERSAL DATA RESEARCH, INC.

2457 Wehrle Dr.  
Buffalo, N.Y. 14221

716-631-3011

## A 16K Static Memory Board for the 6800 AND 6809 SS-50 c Bus



• Populated in 4K segments using the industry standard 4Kx1 memory chip. (4044, 5257 etc.)

• Decodes 16 or 20 address lines, may occupy any 16K segment within a one megabyte range

• Full kit \$ 259 • Assembled \$ 319

• Semikit (all parts but memory) \$ 69

• Board and documentation \$ 29



American Computer Works

PO BOX 32874

OKLAHOMA CITY, OKLA. 73123

405-722-8808

# SMOKE SIGNAL BROADCASTING

Presents

## 3 Powerful New SS-50/SS-50C Boards

### **DCB-4** **Disk Master** **Double Density Controller Board** **and DOS68D Double Density DOS** **\$449.00**

The new DCB-4 is a truly state-of-the-art development which allows up to 366K bytes to be stored on a single 5¼" disk and has these outstanding features:

- Up to four 5¼" and four 8" drives can be handled in the same system with a user definable logical unit table. (DOS68D will be compatible with future hard disk systems).
- Under software control, the user can select the following for any drive:
  - ☆ Single sided or double sided operation.
  - ☆ Single density or double density data.
  - ☆ 5¼" or 8".
  - ☆ Stepping Rate.
  - ☆ 40 track or 35 track density on double sided 5¼" drives.
  - ☆ User can select the system boot configuration.
- Occupies only 16 bytes of memory space (F760-F76F standard). User selectable to any 16 byte address space.
- Can read and write a single sector by itself. On-board buffer memory allows full interrupt capability in interrupt driven systems. Once data transfer has been initiated, no more processor time is required.
- Contains extended decoding circuitry for extended addressing per SS-50C bus which can be enabled by an option jumper.
- SSB provides a means for copying software written by older versions of DOS68 to be read by DOS68D. All new media formatted by DOS68D can be read by all older versions of DOS68. DOS68 is SSB's 6800 disk operating system.
- Track 0 of side 0 is recorded in single density per IBM standard.
- Phase-locked-loop assures highest data integrity attainable.

All of these features are available for immediate delivery on one standard 5½" x 9" 50 pin SS-50/SS-50C card for only \$449.00. The price includes DOS68D version 5.1, MONITOR object code on diskette, and a manual with the source listing.

### **SCB-69** **Super Computer Board** **6809CPU Board** **\$299.00**

The most versatile 6809 CPU Board on the market is now available from Smoke Signal Broadcasting and has the following features:

- Standard 2 MHz operation.  
(Shipping 1.5 MHz until 68B09 available)
- 20 bit address generation for up to 1 Mbyte of memory. Uses an improved address translation RAM which is compatible with present extended addressing schemes yet requires much less overhead when used in multi-user systems.
- All on-board devices can be switch selected to occupy any or all extended pages. Any on-board device may be disabled and its memory space is then available for external memory.
- Standard real-time clock (time-of-day, day-of-week, day-of-month) with battery back up capable of generating programmable interrupts.
- Up to 20K of EPROM can be installed on the CPU Board.
- Standard 1K of RAM on board.
- Includes improved 6809 Monitor (and source listing).
- Contains an FPLA for decoding EPROM address and optional devices. Switches are used to select 2K/4K EPROM and Fast/Slow I/O.
- Contains provision for optional 9511/9512 floating point processor.
- NMI line is user selectable to work with either SS-50 or SS-50C busses.

Price for the new SCB-69 is only \$299.00 for an assembled, burned-in fully tested board.

### **M-32-X** **32K** **Memory Board** **\$539.00 \$439.00**

The first and only 32K Static Ram Board on standard size (5½" x 9") SS-50/SS-50C Bus Circuit Card is made by Smoke Signal.

- Switch selectable to any 4K boundary.
- Any 4K block may be switch enabled or disabled.
- Fully compatible with SS-50C extended addressing (allows memory decoding up to 1 Mbyte).
- Extended addressing capability may be switched off for compatibility with SS-50 systems.
- Gold Bus Connectors for high reliability.
- Guaranteed 2MHz operation (tested at 2.2 MHz).
- Low power consumption — 8 volts at 2.4 amps typical.

M-32-X 32K Memory Board is priced at \$539.00.

M-24-X 24K Memory Board expandable to 32K, is \$439.00.

And our M-16-X 16K board is back to the old price of \$299.00.

# SMOKE SIGNAL



# BROADCASTING®

31336 Via Colinas, Westlake Village, CA 91361, (213) 889-9340

**F&D Associates**  
**1210 Todd Road**  
**New Plymouth, Ohio**  
**45654**

**S-50  
 BUS**

Send for free Catalog  
 Visa ~ Master Charge ~ C.O.D.

### This Month's Feature The "BIG MOTHER"

The BMB-1 is a large mother board for S50 systems. It consists of twelve 50 pin and eight 30 pin slots on 1/8" thick epoxy-glass material. The I/O address decoding has been improved over some earlier mother boards offered for the S50 b. s. Each I/O "slot" has been uniquely decoded to either four or eight addresses depending on option settings. The entire I/O section occupies either 32 or 64 addresses and does not "overlap" up thru the 4k block where it is assigned. DIP switches or jumpers can be used to assign the addresses anywhere in memory. An extra line has been provided so that boards on the 50 pin bus can "steal" I/O addresses if desired.

The board can be cut at each four slot section to form four and eight slot versions and the I/O section can be sheared off and Molex connectors added to make an I/O adapter board to add extra slots to the front or rear of a 50 pin bus.

**BMB-1 Bare Board and Documentation \$45.00**  
 add \$2.50 s/h per order

## 6800/6809 PASCAL

**DYNASOFT PASCAL** is a cassette based PASCAL subset designed to run on most 6800/6809 systems with 12K or more of memory.

**DYNASOFT PASCAL** includes most of the control structures of standard PASCAL including IF-THEN-ELSE, CASE-OF-OTHERWISE, WHILE-DO, REPEAT-UNTIL, FOR-TO/DOWNTODO, and recursive PROCEDURE's and FUNCTION's. It supports the data types INTEGER, CHAR, BOOLEAN, scalar (user-defined), subrange, pointer and ARRAY. It is built around a one pass compiler which produces fast, compact p-code and comes complete with a line-oriented text editor, p-code interpreter, and program SAVE and LOAD routines. The whole system resides in less than 8K.

The cassette version with manual is priced at \$35 plus \$3 for postage and handling. Please specify 6800 or 6809.

**Dyna  
 soft**  
 systems ltd.

P. O. BOX 51, WINDSOR JCT.  
 NOVA SCOTIA, CANADA  
 B0N 2V0 (902) 861-2202

## Soft-Rware™ ease yourself into a new dimension of efficiency

### MICRO UTILITY PACKAGE INTRODUCTION MICRO WRITER™

The Micro Writer™ is a report writing utility that enables users to catalog report formats and specifications. The entire system is written in 6800 Assembler for better performance and uses a COBOL oriented language syntax.

The Micro Writer™ turns your printer into a sophisticated printing facility by keeping track of page headings and footings, performing control headings and footings according to your specifications, and generating a number of total accumulations. The MICRO WRITER™ includes translator, run time, and documentation. **\$249.00**

### MICRO SORTER™

The Micro Sorter™ is a tag sort and reformatting utility that allows cataloging sort formats and specifications. Like the Micro Writer™, it is written in 6800 Assembler for better performance and also uses a COBOL oriented language syntax. Use the Micro Sorter™ to enhance your sorting ability by constructing keys from the random data records, performing an ascending/descending sort operation and reformatting the information into a new file for later use. The MICRO SORTER™ includes translator, run time, and documentation. **\$129.00**

**SCREEN FORMATTING, DATA ENTRY and  
 COMMUNICATION utilities** are currently  
 being developed.

### RE-MAT-IT™

The RE-MAT-IT™ is a painless, one-step reformatting utility for SSB DOS 5.1 that will allow you to upgrade disks formatted under 5.1 (or earlier DOS versions) to be compatible with the newer double density disk controller board. **\$ 24.95**

**RE-MAT-IT™ plus DOUBLE DENSITY  
 BOARD \$459.95**

Other Soft-Rware™ packages are available. See August's '68' MICRO JOURNAL for a description of the following:

6800		6809
\$34.95	BASICOMPARE™	\$49.95
\$29.95	ALPHABETIZING PACKAGE	\$39.95
\$34.95	DISK MAINTENANCE PACKAGE	\$49.95
	POWER PATCH F-1™	\$34.95

Write or call for more information.

**Soft-Rware™ is marketed exclusively through  
 RIPLEY COMPUTERS  
 126 N. MAIN ST., SOUDERTON, PA 18964  
 (215) 723-1509**

**CHECKS, MASTER CHARGE, VISA AND COD  
 ACCEPTED  
 DEALER INQUIRIES INVITED**

Soft-Rware, RE-MAT-IT, BASICOMPARE, and POWER PATCH F-1 are trademarks of RIPLEY COMPUTERS  
 MICRO WRITER and MICRO SORTER are trademarks of AUTOMOTION, INC.

6800/6809

## Modem Program

With Disc File Transfer

Instructions and Source Listing \$25.00

Disc with source and object. add \$10.00

Specify 6800 or 6809; 5" or 8"; modem port number (serial interface); SSB, MiniFlex, Flex 2.0 or Flex 9; SWTBUG, Smartbug, GMXBUG, or SBUG-E.

**Microtime** Calendar and Clock Board  
(See Review Feb. 1980 68' Micro Journal)

Circuit board and  
documentations ..... \$ 35.00

Assembled and tested  
(push button set) ..... \$ 95.00

Assembled and tested  
(software set) ..... \$105.00

**AAA Chicago Computer Center**

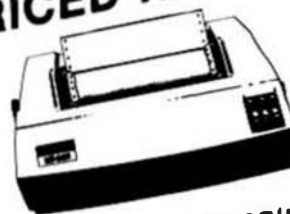
120 Chestnut Lane  
Wheeling, IL 60090  
(312) 459-0450



**Dealer for Gimix, SSB, SWTPC and TSC**

See GIMIX Ad Pages 3 & 48

**RELIABILITY...  
PRICED RIGHT**



You can have an MS-204 PRINTER  
for only \$745 (parallel) or \$795 (Serial)

Check these features!

- ✓ 40, 80, 66 or 132 columns
- ✓ Non-thermal paper, pin feed
- ✓ 96-character ASCII (upper & lower case)
- ✓ Adjustable forms width to 9 1/2"
- Also available 5 1/4" & 8" floppy drives

Add to all this, commercial  
service and you have a winner.

Call (805) 484-9976



P.O. BOX 3016 CAMARILLO CA. 93010

# DYNAMITE™

"THE CODE BUSTER"  
DISASSEMBLES 6800 & 6809 MACHINE CODE  
INTO BEAUTIFUL SOURCE

- Convert your 6800 programs to 6809!
- Automatic LABEL generation
- Allows specifying FCB's, FCC's, FDB's, etc.
- Constants input from DISK or CONSOLE
- Automatically uses system variable NAMES
- DISK-to-DISK or DISK-to-CONSOLE operation  
Includes 5" or 8" FLEX 9 diskette with relocatable  
object code. Full operating instructions (you'll learn in  
minutes!)

Order your DYNAMITE™ today  
Only \$60.00 postpaid in U.S. MC & VISA accepted  
6809, FLEX 9, and 24K total RAM required  
order from:

**COMPUTER SYSTEMS CENTER**

13461 Olive Blvd.  
Chesterfield, MO 63017  
(314) 576-5020



we also stock SWTPC, TSC, JPC products  
hours 12-9 daily, 10-5 Saturday

Dealer inquiries welcome  
FLEX is a trademark of TSC (Bless their hearts)

## OSBORNE BUSINESS PROGRAMS

This ENHANCED IMPLEMENTATION of the Osborne and Associates Business Programs is the only implementation available with the full capability of the original Wang Minicomputer version.

### FEATURES INCLUDE:

- ★ KEYED FILES to eliminate slow searches and sorts.
- ★ PASSWORD and MASTER PASSWORD PROTECTION to limit unauthorized access to your business data.
- ★ SELF-PROMPTING to perform data backups.
- ★ NEW MODULES for additional usefulness. A Cash Journal program, terminal configuration program, file initialization program, sample data base, etc.

These programs are now available in compiled TSC X BASIC on both 5" and 8" floppy disks. All programs run under FLEX (tm) 2.0 on 6800 or 6809 Computer systems. System requirements are 48K contiguous RAM, 132-column printer, and two floppy-disk drives.

ACCOUNTS RECEIVABLE	\$295*
ACCOUNTS PAYABLE	\$295*
GENERAL LEDGER	\$295*
PAYROLL with COST ACCOUNTING	Late September



**Great Plains Computer Company, Inc.**

P.O. Box 916, Idaho Falls, Idaho 83401

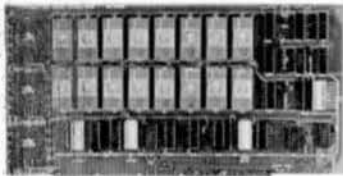
208—529-3210



# DIGITAL RESEARCH COMPUTERS

(214) 271-3538

## 32K S-100 EPROM CARD NEW!



**\$74.95**  
KIT

USES 2716's  
Blank PC Board - \$34  
ASSEMBLED & TESTED  
ADD \$30

SPECIAL: 2716 EPROM's (450 NS) Are \$19.95 EA. With Above Kit.

### KIT FEATURES:

1. Uses +5V only 2716 (2Kx8) EPROM's
2. Allows up to 32K of software on line
3. IEEE S-100 Compatible
4. Addressable as two independent 16K blocks
5. Cromemco extended or Northstar bank select
6. On board wait state circuitry if needed
7. Any or all EPROM locations can be disabled
8. Double sided PC board, solder-masked, silk-screened
9. Gold plated contact fingers
10. Unselected EPROM's automatically powered down for low power
11. Fully buffered and bypassed
12. Easy and quick to assemble.

## 16K DYNAMIC RAM PARTIALS

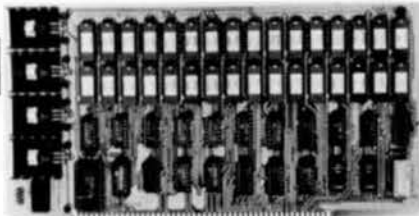
LOOK! INTEL 2108 8K X 1 RAMS 8 FOR \$9.95 32 FOR \$35 LOOK!  
FACTORY PRIME!

Huge special purchase of INTEL Dynamic RAM's. These are 2108-4, 300NS, 8K, Ceramic DIP. The 2108 is the INTEL 2116 (16K) tested for either upper or lower 8K only. These are factory prime. Full Spec. See INTEL 1978 Cat. for details or Memory Design Handbook for application data. Both IMSAI and EXTENSYS did mfg. S-100 RAM boards using these devices. — P.S. These devices will not work in the SD EPANDORAM™. Please specify upper or lower 8K. (S1626 or S1627). A super easy RAM to interface to a Z80, 16 PIN DIP.

FOR SALE! LOW POWER - 300NS 8 FOR \$44  
4MHZ 2114 RAM SALE!  
4K STATIC RAM'S. MAJOR BRAND. NEW PARTS.  
These are the most sought after 2114's. LOW POWER and 300NS FAST.  
8 FOR \$44

## 16K STATIC RAM KIT-S 100 BUSS

PRICE CUT!  
**\$225** KIT  
FOR 4MHZ  
ADD \$10



### KIT FEATURES:

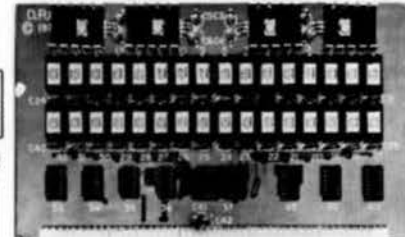
1. Addressable as four separate 4K blocks
2. ON BOARD BANK SELECT circuitry (Cromemco Standard) Allows up to 512K on line
3. Uses 2114 (450NS) 4K Static Ram's
4. ON BOARD SELECTABLE WAIT STATES
5. Double sided PC Board, with solder mask and silk screened layout. Gold plated contact fingers
6. All address and data lines fully buffered
7. Kit includes ALL parts and sockets
8. RHANTOM is jumpered to PIN 67
9. LOW POWER: under 1.5 amps TYPICAL from the +5V Bus
10. Blank PC Board can be populated as any multiple of 4K

BLANK PC BOARD W/DATA-\$33  
LOW PROFILE SOCKET SET-\$12  
SUPPORT IC'S & CAPS-\$19.95  
ASSEMBLED & TESTED-ADD \$35

OUR #1 SELLING  
RAM BOARD!

## 16K STATIC RAM SS-50 BUSS

PRICE CUT!  
**\$229** KIT  
FULLY STATIC!  
FOR 2MHZ  
ADD \$10



FOR SWTPC  
6800 BUSS!

ASSEMBLED AND  
TESTED - \$35

### KIT FEATURES:

1. Addressable on 16K Boundaries
2. Uses 2114 Static Ram
3. Fully Bypassed
4. Double sided PC Board. Solder mask, and silk screened layout
5. All Parts and Sockets included
6. Low Power: Under 1.5 Amps Typical

BLANK PC BOARD-\$30 COMPLETE SOCKET SET-\$12  
SUPPORT IC'S AND CAPS-\$19.95

## NEW! STEREO! S-100 SOUND COMPUTER BOARD NEW!

At last, an S-100 Board that unleashes the full power of two unbelievable General Instruments AY3-8910 NMOS computer sound IC's. Allows you under total computer control to generate an infinite number of special sound effects for games or any other program. Sounds can be called in BASIC, ASSEMBLY LANGUAGE, etc.

### KIT FEATURES:

- TWO GI SOUND COMPUTER IC'S
- FOUR PARALLEL I/O PORTS ON BOARD
- USB'S ON BOARD AUDIO AMPS OR YOUR STEREO
- ON BOARD PHOTO TYPING AREA
- ALL SOCKETS, PARTS AND HARDWARE ARE INCLUDED.
- PC BOARD IS SOLDERMASKED, SILK SCREENED, WITH GOLD CONTACTS
- EASY, QUICK, AND FUN TO BUILD, WITH FULL INSTRUCTIONS
- USB'S PROGRAMMED I/O FOR MAXIMUM SYSTEM FLEXIBILITY

Both Basic and Assembly Language Programming examples are included.

### SOFTWARE:

SCL™ is now available! Our Sound Command Language makes writing Sound Effects programs a SNAP! SCL™ also includes routines for Register Examine-Modify, Memory-Examine-Modify, and Delay-Memory. SCL™ is available on CPM™ compatible diskette of 2708 or 2716 Diskette - \$24.95 2708 - \$19.95 2716 - \$29.95 Diskette includes the source. EPROM's are OR'd at E000H.

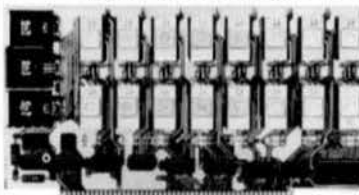
COMPLETE KIT!  
**\$84.95**  
(WITH DATA MANUAL)

BLANK PC  
BOARD W/DATA  
\$31

## RCA CMOS COMPUTER CHIP SET

- INCLUDES:
- |                         |                        |
|-------------------------|------------------------|
| 1-CDP1802CD CPU         | 1-CDP1861CD VIDEO IC   |
| 2-CDP1822CE 256 x 4 RAM | 1-CDP1862CE COLOR GEN. |
| 1-CDP1858CE 4 BIT LATCH | 1-CDP1863CE SOUND GEN. |
- COMPLETE SET \$45 LIMITED QTY

## 16K EPROM CARD-S 100 BUSS



**\$59.95**  
KIT

BLANK PC BOARD - \$28

USES 2708's!

Thousands of personal and business systems around the world use this board with complete satisfaction. Puts 16K of software on line at ALL TIMES! Kit features a top quality soldermasked and silk-screened PC board and first run parts and sockets. Any number of EPROM locations may be disabled to avoid any memory conflicts. Fully buffered and has WAIT STATE capabilities.

ASSEMBLED AND FULLY  
TESTED - ADD \$30

OUR 450 NS 2708'S  
ARE \$8.95 EA. WITH  
PURCHASE OF KIT

## NEW! G.I. COMPUTER SOUND CHIP

AY3-8910 As featured in July, 1979 BYTE! A fantastically powerful Sound & Music Generator. Perfect for use with any 8 Bit Microprocessor. Contains: 3 Tone Channels, Noise Generator, 3 Channels of Amplitude Control, 16 bit Envelope Period Control, 2-8 Bit Parallel I/O, 3 D to A Converters, plus much more! All in one 40 Pin DIP. Super easy interface to the S-100 or other busses.

SPECIAL OFFER: \$14.95 each Add \$3 for 60 page Data Manual.

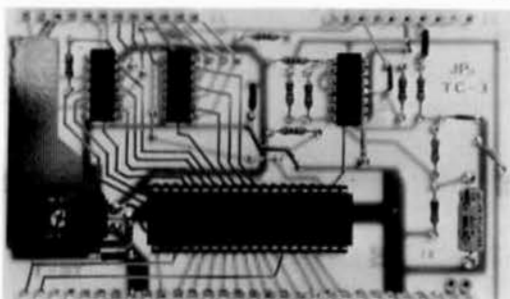
TERMS: Add \$1.25 postage. We pay balance. Orders under \$15 add 75c handling. No C.O.D. We accept Visa and Master Charge. Tex. Res. add 5% Tax. Foreign orders (except Canada) add 20% P & H. 90 Day Money Back Guarantee on all items. Orders over \$50, add 85c for Insurance.

**Digital Research Computers**  
(OF TEXAS)

P.O. BOX 401565 • GARLAND, TEXAS 75040 • (214) 271-3538

## JPC PRODUCTS FOR

# 6800 COMPUTERS

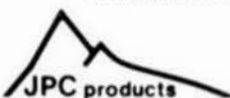


### High Performance Cassette Interface

- **FAST** - 4800 Baud Loads 4K in 8 Seconds!
- **RELIABLE** - Error Rate Less Than 1 in 10<sup>6</sup> Bytes.
- **CONVENIENT** - Plugs Directly Into The SWTPC.
- **PLUS** - A Fully Buffered 8 Bit Output Port Provided.
- **LOW COST** - \$59.95 For Complete Kit.

- **OPTIONAL** - CFM/3 File Manager.  
Manual & Listing \$19.95  
(For Cassette Addl) \$ 6.95

TERMS: CASH, MC or VISA. Shipping & Handling \$3.00



Order Phone (505) 294-4623  
P.O. Box 5615  
Albuquerque, N.M. 87185

## 6800/6809 SOFTWARE

### ACCOUNTS PAYABLE #1300

Produce financial reports, print checks, special control letter. Reports by vendor number, invoice number, aged and history file. Autosorting of vendor and invoice files. Plus check and pre check journals. \$600.00

### ACCOUNTS RECEIVABLE #1500

Produce financial reports, prints statements, produces reports by customer account number, invoice by customer account number and invoice by invoice number. Print aged report and trial balance. Keeps history file and auto sorting of files. \$600.00

### GENERAL LEDGER #100

Program updates to ledger files and also generates reports on payroll, sales, accounts payable, cash and expense statistics. Balance sheet and profit & loss reports. Information can be generated for year end taxes, 941 and W2 forms. \$595.00

### INVENTORY II #700

Produce inventory reports by description or vendor, print activity reports for one day, one month or one year. Quick search by part number, produce total inventory and financial report. (For one store) \$200.00

### MAILING LABELS #100

Print mailing labels from your complete file, for a particular city or state. Use one-part mailing labels. \$ 50.00

### MAILING LABELS #400

Same as #100, but also prints labels by names. Use multiple-part labels. \$125.00

### BASIC—0935

For those with applications in SWTP 3.5 BASIC. Runs on 6809 and 6809S. 30% faster and can be used with existing 6800 BASIC programs. No manual commands and statements same as SWTPC BASIC 3.5. Ideal to keep you going while changing to new BASICs. 5 1/4 or 8 inch 09 Disk, with renumber routine. \$ 59.95

Available from Computer Stores or order direct from:  
Omni-Tronica Inc. Rt. 130 N. of Half Acre Rd.  
Cranbury, NJ 08512  
Phone: 609-655-1100

••Customized programs for your business requirements••  
Charge your order to your Visa or Master Charge

## 6809— DATA FILE MAINTENANCE

STOP writing dinky little programs for all the one-time changes to one item on a data file. START bringing up new systems without long weeks of programming.

The General Data File Maintenance Program can add, delete, insert, and modify data on any file you have\*! The powerful security allows you to restrict modification of data already entered.

This software tool will save you days of programming effort with commands that can list, print or show your data. Some of the many things you might use it for are: Inventory files, Customer files, Real Estate Listings, plus many more. Let your imagination run WILD!

You can format the items in many ways with this 6809 Extended BASIC program. Some of the options available are right or left justify, item length, etc.

Order your diskette today for only \$49.95! Use Master Charge, VISA or check. Specify diskette size.

Tennessee residents add 6 1/4% sales tax. Customers outside Canada or USA add \$5.00 for air postage and handling. If you wish to order by phone, give us a call at (615) 396-2161

Coming soon VER. 2.1 for TSC Multiuser Basic®  
\*Record sizes up to 252 bytes.

# dp systems

po box 567

collegedale tn 37315

## 6800 Software Hardware, Firmware

This month's Special...

## BASTRAN

Written by Ron Anderson, BASTRAN is a Basic preprocessor for use with either miniflex or flex 2.0 (TM of ISC). Lets you write your Basic programs with long variable names instead of just one or two characters; you can use labels for lines instead of line numbers, and add all the remarks you want so that your program becomes self-documenting. Then use BASTRAN to translate into standard Basic and run. Can be used with SWTP Basic, A/BASIC, ISC Basic, or any other standard Basic. Lists at \$30, for this month only subtract 10 percent or combine with BASIC-UP Utility Package (miniflex only) for a total of \$50. Specify DOS and Basic. Includes free copy of FLOGEM. Add \$5 and get Eliza too.

### STAR - KITS

P.O. Box 209, Mt. Kisco, N.Y. 10549

# COMPUTERWARE

## is serious about 6800 / 6809

### System Software

DOS/Utilities	Random BASIC
MONITOR	BASREF (cross ref.)
XREF (cross ref.)	RENBAS (renumbering)
Assembler	Editor

### Application Software

Accounts Receivable	Payroll
Accounts Payable	Medical Office
Ledger Accounting	Word Processing
Inventory Control	Mailing System
Random Data Organizer / Report Generator	

all available for both 6800 and 6809  
Applications for home, small business, and commercial users

### And we have the hardware too!

Smoke Signal Broadcasting • SWTPC  
Centronics • NEC • Anadex • SOROC  
MicroWorks • Thomas • Newtech • Sanyo

Call, Write, or Come See Us at:  
**COMPUTERWARE**  
1512 Encinitas Blvd. Box 668  
Encinitas, CA 92024  
(714) 436-3512

## HAZELWOOD COMPUTER SYSTEMS

St. Louis Area's full service computer center featuring the outstanding GIMIX product line and the 6809 processor.

- ★ GIMIX computer systems configured to your needs...  
A TOTAL SYSTEMS approach
- ★ Laboratory data acquisition systems
- ★ Interfaces designed and built for special needs
- ★ Professional repair service... All makes and models
- ★ Friendly, courteous staff of computer professionals...  
No salesmen or clerks
- ★ A great place for meeting other 68 Users

### OUR OWN VIDEO GRAPHICS CONTROLLER BOARD ...

- ★ 8 MHz bandwidth for high resolution display
- ★ 256X256 jitter-free display (256X250 on some monitors)
- ★ True X-Y single PIXEL addressability
- ★ Displays math functions directly... no software driver
- ★ Single command erase... erases in 1/60 second
- ★ Self-contained X-Y memory... does not use system address space
- ★ Plugs into any SS-50 I/O bus slot
- ★ Crystal controlled timing... no adjustments
- ★ 75 ohm composite video output
- ★ Synchronized write timing... no screen splatter
- ★ No initialization or software driver required
- ★ 350.00 assembled and tested (video monitor required)

ORDER #VC-256

### Dele Chamberlain's BASIC CROSS REFERENCE PROGRAM ...

- ★ Works with TSC BASIC, BAS files
- ★ Written in 6809 assembly language for high speed
- ★ 24.95 with instructions and 5 1/4" diskette ORDER #BASXRF

Master Card VISA American Express Diner's Club Cards

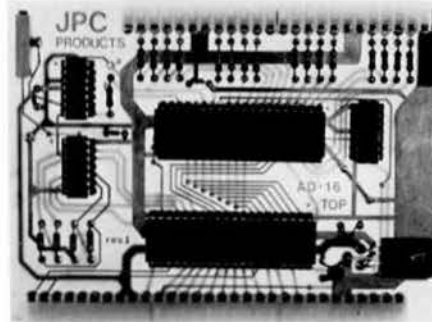
Michael L. Smith General Manager  
Hazelwood Computer Systems  
7413 N. Lindbergh  
Hazelwood, Missouri 63042  
(314) 837-3466

SEE GIMIX AD PAGES 3, 48



## JPC PRODUCTS FOR

# 6800 COMPUTERS



USES  
ONE  
I/O  
SLOT

### 16 CHANNEL A/D BOARD

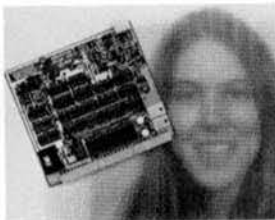
- 8 BIT DATA
- SOFTWARE CONTROLLED GAIN
- 3300 SAMPLES PER SECOND
- $\pm 0.7\%$  ACCURACY

COMPLETE KIT: AD-16 \$69.95

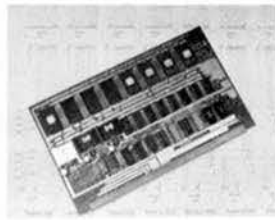
Terms: Cash, MC or Visa; Shipping & Handling \$3.00



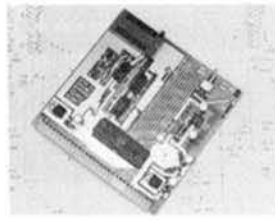
Order Phone (505) 294-4623  
P.O. Box 5815  
Albuquerque, N.M. 87185



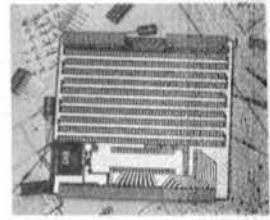
DS-68 DIGISECTOR



PSB-08 PROM SYSTEM BOARD



B-08 EPROM PROGRAMMER



UIO UNIVERSAL I/O BOARD

## INNOVATIVE PRODUCTS FOR 6800 USERS

**DS-68 DIGISECTOR** is a random access video digitizer featuring 256 x 256 picture element scan and 64 levels of grey scale, with conversion times as low as 3 microseconds per pixel. It accepts either interlaced (NTSC) or non-interlaced (industrial) video input. Use it for computer portraiture, moving target indicators, precision security systems, fast to slow scan conversion... with clever software, the Digi-sector can read just about anything. Truly a professional tool at a price you can afford. \$169.95

**B-08 2708 EPROM PROGRAMMER** is a compact unit that fits in the 6800's I/O slot. A safety switch and LED indicator provide control over the high programming voltage generated on board. An industrial quality Textool socket and extended board height allow effortless PROM insertion and retrieval. Fully commented source listings of U2708 is included in the Owner's Manual. \$99.95

**U2708** utility for testing, burning, verifying and copying 2708s in EPROM. \$29.95

**PSB-08 PROM SYSTEM BOARD** features 1K of high speed, low-power RAM and space for up to 8 2708 EPROMs, both DIP-switch addressable to start on any 8K boundary in memory. The exclusive I/O select feature allows you to move I/O locations up to any unused 1K block in the EPROM memory space. This permits memory expansion to a full 56K of contiguous user RAM. \$119.95

**DM-85 DISK MIXER** is an add-on board for the Smoke Signal Broadcasting BFD-68A Disk Controller which allows operation of both 8" and 5" drives. Controller mode (8" or 5") is selected on a drive-by-drive basis, so any mix of 5" and 8" drives is allowable. The 2" x 3" PC board mounts inconspicuously on the back of the BFD-68A. Its operation is completely transparent to software. An oscilloscope is required for the setup procedure. Kit Price: \$39.95

**M6809 EMULATOR** is a machine language program that will emulate all of the functions of the Motorola 6809 third generation microprocessor. Developed for use on any 6800 system, the program allows software development and debugging. The 3K byte program is complete with a 6809 mini-monitor and single-step trace routines. Fully commented source listing included. Specify Smoke Signal Broadcasting or FLEX™ disk, or KCS cassette. \$49.95

**UIO UNIVERSAL I/O BOARD** helps you with your custom interfaces. It has space for a 40-pin wire wrap socket into which you may plug any of Motorola's 40 or 24-pin interface chips. All data and control lines are connected to the appropriate edge connector pins. All other bus connections are brought out to a 16-pin socket pad. +5 volt regulator and all Molex connectors are provided; regulated +5 and ground are bused among the locations for up to 35 14-pin ICs. \$24.95

THE **MICRO  
WORKS**

P.O. BOX 1110, DEL MAR, CA 92014 714-942-2400



## TIRED OF PLAYING THE QUESTION AND ANSWER GAME?

Frustrated by the limitations of **BASIC**? Tired of question and answer data entry? Ever wish you could enter and update data the way the **BIG SYSTEMS** do it? Irritated by having to re-enter someone's entire name when all you wanted to do was change one letter? **WAIT NO MORE! NOW YOU CAN**

### CONFORM

**ALFORD AND ASSOCIATES** is proud to present the biggest little item to hit the small systems world since **BASIC** itself. **A & A** has produced a program that allows users of **MEMORY-MAPPED VDU'S** to display a data-entry form on-screen. Fill in the blanks, make **SCREEN-EDIT** changes with functions such as **INSERT SPACE, DELETE CHARACTER, ERASE TO END OF FIELD, ERASE FIELD, TAB FIELDS, CLEAR ALL DATA FIELDS**, for new entry, etc., and do it all under the control of your **BASIC** program!

### CONFORM works with

**ANY POPULAR BASIC - TSC, COMPUTERWARE, SWTPCO, ETC. . . .**  
**ANY POPULAR DISPLAY - GIMIX, PERCOM, SSB, THOMAS, ETC. . . .**

Why play the question and answer game with your **BASIC** program? **CONFORM** with **A & A CONTROL FORM's** data entry **BASIC** overlay program today! Available now on disc or cassette for only

**\$24.95**

including program media, source listing, sample programs and manual

**ALFORD AND ASSOCIATES, P. O. BOX 6743, RICHMOND, VA., 23230-804-329-3906**

Shipping and handling extra on orders under \$100 004/va. Residents add 4% Sales Tax. **UPS COD, VISA, MASTERCHARGE**, personal checks all accepted graciously

## THE SCREDITOR SCREEN EDITING UTILITY IS NOW EVEN BETTER!

### CHOOSE ONE FROM COLUMN A AND ONE FROM COLUMN B

A (DOS)

B (VDU)

SSB DOS 4.X

GIMMIX 80x24

SSB DOS 5.X

GIMIX 64x16

MINIFLEX

SSB VDB-1

FLEX 1.0

THOMAS INSTRUMENTATION

FLEX 2.0

PERCOM

### CHOOSE ONE FROM COLUMN A AND ONE FROM COLUMN B

Thanks to your acceptance of the **SCREDITOR**, and in a fit of silliness because of the birth of our first son a couple of weeks ago, we are now offering this fantastic program at the **NEW LOW PRICE** of only

**\$69.95**

Manual only: \$14.95 Complete source listing: \$39.95

## Model EP-2A-88 EPROM Programmer



Fast as Jackrabbits . . . Well, almost!

In Australia, two rabbits can reproduce over 13 million offspring in 3 years . . . at 105 seconds per 2716, the EP-2A-88 can reproduce 1,892,160 EPROMS in 3 years. Single push button control, the EP-2A-88 checks if EPROMS are erased, programs and verifies. It also checks for defective ROMS.

Two basic models are available. The EP-2A-88-1 will accept Copy (CM) modules for the 2758, and 2716 EPROMS. The EP-2A-88-2 will accept copy modules for the 2716, 2732 and TMS 2532 EPROMS. Power requirements are 115 VAC 50/60 Hertz at 15 watts.

Part No.	Description	Price
EP-2A-88-1	EPROM Programmer	\$451.00
EP-2A-88-2	EPROM Programmer	\$451.00
CM-50	Copy Module for 2716 TMS 2516 EPROMS	25.00
CM-70	Copy Module for 2758 EPROMS	25.00
CM-20	Copy Module for 2732 EPROMS	25.00
CM-40	Copy Module for TMS 2532 EPROMS	25.00
	Non-Standard Voltage Option (220 v, 240 v, 110 v)	15.00

**Optimal Technology, Inc.**  
 Blue Wood 127, Earlyville, Virginia 22936  
 Phone (804) 973-5482

## STYLUS™

6809

### WORD PROCESSING SYSTEM

### 6809 word processing has finally arrived !

The **STYLUS™** text processor is an incredibly easy to use but powerful system for text editing and formatting.

- **FULL FEATURED CURSOR BASED EDITING**- cursor movement, scrolling, paging, deletes (character, word, or line), global search, block move and more!
- **FULL COMPLIMENT OF FORMATTING COMMANDS**- centering, justification, headers, footers, underlining, superscript, subscript, boldface.
- **TEXT FORMATTED ON THE SCREEN**- no surprises at printout time, effects of most formatting commands are instantly visible on the screen.
- **FLEX COMPATIBLE**- can be used to edit programs.
- **FULL SUPPORT**- versions for most common serial terminals with clear screen function running at 9600+ baud (memory mapped versions available fall 1980) —supported printers include Diablo, NEC, Qume, and regular tty.

When ordering specify your terminal, printer and disk size (5 or 8 inch).

Price: \$150.00

NY residents add

Manual only: \$15.00

sales tax.

**STYLUS™** is a trademark of **SONEX SYSTEMS**. **FLEX™** is a trademark of Technical Systems Consultants.



**SONEX SYSTEMS**

BOX 238 WILLIAMSVILLE, NY 14221

**716-634-2466**

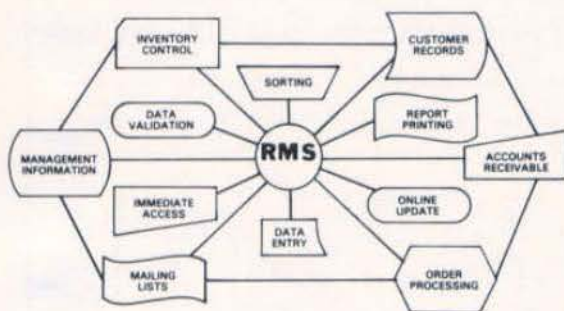
# 6809

## RECORD MANAGEMENT SYSTEM

# RMS

# DATABASE MANAGEMENT

- USER DEFINED DATA DICTIONARY AND RECORD FORMAT
- SCREEN ORIENTED, FORM FILL OUT TYPE OF ACCESS
- OPTIONAL TWO LEVEL RECORD HIERARCHY
- ALL FILES IN ASCII TEXT FORMAT, BASIC COMPATIBLE
- DIRECT ACCESS BY KEY FIELD, MULTIPLE INDEX FILES
- EXTENSIVE DOCUMENTATION, SAMPLE APPLICATION INCLUDED
- VERSATILE, PROFESSIONAL QUALITY REPORT WRITER
- BUILT-IN SORT/MERGE •EASY TO USE



RMS is a complete DATABASE MANAGEMENT system for the 6809 computer. It runs under Flex, and supports the CT-82, or other CRT terminal. RMS is a set of five machine language programs that make up the most powerful business programming tool available for the 6809. It can be used by the relative novice, to implement an incredible variety of information storage and retrieval applications, without any programming. However, the programmer can use RMS as part of the solution to a larger problem, saving many hours of unnecessary program development time. RMS can be used to handle data input, editing, validation, on-line retrieval, sorting and printed reports. Custom data manipulation can be filled in by the user's BASIC programs.

### WASHINGTON COMPUTER SERVICES

3028 SILVERN LANE  
BELLINGHAM, WA 98225  
A DIVISION OF MICROPI  
1-206-734-8248

## \$200

SINGLE CPU LICENSE  
5 OR 8 INCH DISK  
TERMS: CASH/VISA/MC

SAVE

DISK



5" Soft Sector \$2.77 each  
5" 10-16 Sector \$2.77 each

8" Single Side, Double  
Density \$3.75 each  
8" Double Side, Double  
Density \$4.75 each

Dealer and Volume Discounts Available

**SOUTH EAST MEDIA SUPPLY**

P.O. Box 794 Hixson, TN 37343 615-870-1993

### 6800 PRODUCTS AT A-VIDD

#### Software Dynamics Compiler

The SD Compiler Basic is the most well developed basic for the 6800. Some of the more notable features include: Formatted Print Statements, If Then Else & While Do, variable names up to 15 characters and high speed execution. Both random and sequential device I/O can be done, in either binary or ASCII mode for data flow control to the byte. Now available for Flex II, Flex I, and SSB Flex II. Package includes: Basic Compiler, Mal Assembler (with extensive manuals for each), run time package and 4 misc. utilities. Call or write for detailed catalog. Dealer inquiries invited.

Price ..... \$330.00

**Added Bonus.** For every retail compiler package purchased, you will receive one SPL/M 6800 pure code compiler, a \$50.00 value.

Also available, Software Dynamics Editor.

Price ..... \$100.00

#### Microtime 6800

Plugs into any I/O port of the SWTPC 6800. Supplies user with time in hours, minutes, seconds, AM or PM, month, date and year. (i.e.: 7/1/80 12:00:00 PM PST). Provisions for optional battery or external power supply. Supplied with software to set time, interrogate clock, and print time.

Assembled & Tested ..... \$ 95.00  
Bare Board w/DOCS ..... \$ 35.00

Immediate delivery. Phone and mail orders accepted. We ship worldwide IF O.B. Long Beach).

**A-VIDD**  
electronics co.

2210 Bellflower Blvd,  
Long Beach, CA 90815  
(213) 598-0444  
(714) 821-0870

Three blocks South of the San Diego Freeway in the Los Altos Center.

Mon. - Thurs.  
Hours: Friday  
Saturday

8:30 AM - 5:30 PM  
8:30 AM - 9:00 PM  
10:00 AM - 5:30 PM





# Series 2000

## Brings it all Together!



### Hardware Features

- 2 MHz. 68800 MPU
- Double Floppy Disk Drive - 368K bytes formatted
- 32K, 48K, or 64K byte dynamic RAM
- Intelligent Video Terminal
- Commercial typewriter keyboard with function keys and numeric pads
- 2 RS-232C serial ports

### Software Features

- UCSD Pascal™ System Software Package
- 6800 Multi-tasking System (MTS6800)
- Business BASIC Compiler
- WORDMATE™ Word Processor
- Various Application Packages

\* UCSD Pascal is a trademark of the Regents of the University of California.

### Packaging

- Attractive, Compact, desktop enclosure
- Light-weight, highly portable
- Provision for 3 I/O Expansion modules
- Highly reliable, ease of maintenance

**Price:** • Quantity 1 (one) end user price **\$2,995** • Attractive OEM/Dealer Discounts Available



**WAVE MATE INC.**  
18005 Adna Maru Lane  
Carson, California 90746  
213-532-4532  
Telex 194369

**EUROPEAN HEADQUARTERS**  
**WAVE MATE INTERNATIONAL**  
159 Ch de Vleurget  
1050 Bruxelles, Belgium  
(02) 649-1070 Telex 24050



## 6809!

### INTRODUCING THE NEW STATE-OF-THE-ART IN MICROCOMPUTER SOFTWARE FROM MICROWARE

#### OS9-1 SINGLE USER

#### OS9-1 WITH TAPE FILE MANAGER

	on 2716's	\$ 95.00
	on 2708's	\$ 95.00
Manual & Source	only	\$ 85.00

#### OS9-1 WITH DISK FILE MANAGER

	on 2716's	\$150.00
	on 2708's	\$150.00
Manual & Source	only	\$150.00

#### DEBUGGER PACKAGE

(aprox 1K)

	on 2716's	\$ 50.00
	on 2708's	\$ 50.00
	on tape	\$ 35.00
	on disk	\$ 35.00
Manual & Source	only	\$ 50.00

#### INTERACTIVE EDITOR/ASSEMBLER

	on 2716's	\$180.00
	on 2708's	\$180.00
	on tape	\$150.00
	on disk	\$150.00
Manual & Source	only	\$150.00

Above items available after aprox. June 1, 1980.

See GIMIX ad  
Pages 3 & 48



COMING SOON!!!

**BASIC09**

**OS9-2 MULTIUSER**

When ordering, you must specify; type of CPU card, type of disk controller, size of media and starting address for your I/O ports.

From the company that puts it all together. GIMIX, SMOKE, SWTPC, MICROWARE, ANADEx, SPINWRITER, DIGITUS, HI-PLOT, MICROWORKS. . .

## H H H ENTERPRISES

BOX 493, Laurel, MD.  
ZIP 20810  
PHONE 301-953-1155

# BLITZ

## SCREEN EDITOR FOR THE CT-82

- IDEAL FOR WORD PROCESSING OR PROGRAMMING
- THERE IS NO FASTER / EASIER WAY TO EDIT TEXT
- IT ALL HAPPENS IMMEDIATELY ON THE SCREEN SO YOU SEE EXACTLY WHAT YOU ARE DOING: INSERT CHARACTER, DELETE CHARACTER, INSERT LINE, DELETE LINE, SCROLL UP, SCROLL DOWN
- RUNS ON 6800 OR 6809 UNDER TSC's FLEX
- AVAILABLE ON 5 OR 8 INCH DISKETTE
- BEST OF ALL — YOU CAN BUY THE ENTIRE ASSEMBLY LANGUAGE SOURCE CODE, SO YOU CAN ADD YOUR OWN CUSTOM FEATURES
- FROM THE COMPANY THAT BROUGHT YOU THE MICROPI 4-USER PILOT/BASIC/EDITOR PACKAGE

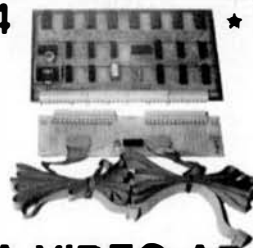
**\$50 — OBJECT ONLY**

**\$100 — SOURCE AND OBJECT**



★ CT-64

★ CT-1024



## ★ DMA VIDEO ADAPTER FOR YOUR TERMINAL

- DMA (ability to update anyplace on the screen directly)
- HIGH SPEED DISPLAY (fast as any video board)
- KEYBOARD CONTROL (of baud rate and paging /scrolling)
- DOCUMENTATION (includes source listing that replaces Outee)

J.B.I. adapter with memory \$162.95, J.B.I. adapter without memory \$149.95. Source Code on Disk \$5.00 — Tape \$3.50

Provide your system configuration and software.  
Terms: cash, MC, Visa or C.O.D. plus \$3.50 shipping and handling.

## Johnson Micro Computer

2607 E. Charleston  
Las Vegas, Nev. 89104  
1-702-384-3354



## HEMENWAY ASSOCIATES SOFTWARE SOURCE BOOKS™

Your 6800 is up and running with HEMENWAY ASSOCIATES' complete software system. Software Source Books provide a powerful yet extensible programming package for business, scientific, or personal uses.

Combining detailed descriptions with COMPLETE SOURCE CODE LISTINGS, these books explain the internal operations and algorithms used in HEMENWAY ASSOCIATES' popular systems software.

Imagine getting a complete 6800 software library, and at these suprisingly low prices.

Remember, these are not just books; they are Software Source Books™ complete software resources! Order them today; VISA and MASTERCHARGE accepted.

### CP/68 OPERATING SYSTEM

The most powerful operating system available for the 6800 family of microprocessors, this disk-based system features great flexibility. The user can add commands for special purposes. A single transient Peripheral Interchange Program (PIP) transfers data between devices. The system is relocatable anywhere in memory and fits in less than 8K. Other features include device-independent I/O and dynamic file allocation.

U.S. \$34.95  
Int. \$52.45

### XA6809

#### MACRO LINKING CROSS-ASSEMBLER

This new two-pass program generates relocatable and linkable code (requires LINK68). Resident on any 6800 system, XA6809 lets you produce code for a 6809 right now. This assembler has full macro facilities and features a COMMON section for the production of ROMable code, Conditional Assembly and fast execution.

U.S. \$24.95  
Int. \$31.50

### LINK68 LINKING LOADER

This is a one-pass linking loader which allows separately translated relocatable object modules to be loaded and linked together to form a single executable load module, and to relocate modules in memory. It produces a load map and a load module in Motorola MIKBUG loader format. This book provides everything necessary for learning about this system and the nature of linking loader design in general.

U.S. \$7.95  
Int. \$11.95

### RA6800ML RELOCATABLE MACRO ASSEMBLER

This two-pass assembler produces a program listing, a sorted symbol table listing, and relocatable object code. The object code is loaded and linked with other assembled modules using LINK68. This book fully describes the 6800 assembly language and all major routines used, and includes flow charts, details on interfacing the assembler. Cross-referenced, showing all calling and called-by routines, pointers, flags and temporary variables.

U.S. \$24.95  
Int. \$37.45

### Structured BASIC language STRUBAL+™COMPILER

The compiler features variable precision from 4 to 14 digits for business or scientific uses and Structured Programming forms. It produces Relocatable and linkable code. You can create data structures with mixed data types, COMMON and DUMMY sections. STRUBAL+™ includes a complete scientific package. It allows for string-handling and is extensible.

U.S. \$49.95  
Int. \$74.95

Please send the following books:

\_\_\_\_ copies CP-68 OPERATING SYSTEM  
\_\_\_\_ copies STRUBAL+™ COMPILER  
\_\_\_\_ copies XA6809 CROSS ASSEMBLER  
\_\_\_\_ copies RA6800ML MACRO ASSEMBLER  
\_\_\_\_ copies LINK68 LINKING LOADER

**HEMENWAY ASSOC., INC.**  
101 TREMONT STREET  
BOSTON, MA 02108  
(617)426-1931

FOR NORTH AMERICA, ADD \$ 7.50 BOOK POSTAGE & HANDLING or \$1.00 BOOK FOR FIRST CLASS  
ALL OTHER DESTINATIONS, ADD \$2.00 BOOK POSTAGE & HANDLING or \$3.50 BOOK FOR PRIORITY MAIL

Name \_\_\_\_\_ Title \_\_\_\_\_ Company \_\_\_\_\_  
Street \_\_\_\_\_ City \_\_\_\_\_ State/Country \_\_\_\_\_ Postal Code \_\_\_\_\_

☐ CHECK ENCLOSED IN THE AMOUNT OF \$  
☐ BILL VISA ☐ BILL MASTERCHARGE  
CARD NUMBER \_\_\_\_\_ EXP. DATE \_\_\_\_\_  
☐ FIRST CLASS/PRIORITY ☐ BOOK RATE

## ED SMITH'S SOFTWARE WORKS NEW 6809 SOFTWARE TOOLS

**CROSSMAC A 6800 TO 6809 CROSS ASSEMBLER** version of RRMAC which runs on your 6800 to produce relocatable 6809 object code from existing (6800) or new (6809) source files. Handles deleted 6800 instructions via macros. Supplied with 6809 machine language linking loader.

**M68CX .....\$200.00**

**RRMAC RELOCATABLE RECURSIVE MACROASSEMBLER and LINKING LOADER** for 6809. The one macro assembler with real macro capabilities. Retains all features of 6800 version.

**M69RR .....\$150.00**

**M6809 RELOCATABLE DISASSEMBLER AND SEGMENTED SOURCE TEXT GENERATOR.** An invaluable tool for modifying large object programs for reassembly on your system.

**M69RS .....\$50.00**

**M6809 RELOCATING ASSEMBLER and LINKING LOADER** is a version of RRMAC without its macro capabilities. Retains all of RRMAC's programmer convenience features.

**M69AS .....\$75.00**

All programs come complete with Programmer's Guide and extensively commented assembly listing. Available on cassette or mini-floppy. Specify cassette, SSB disk, mini-Flex disk or FLEX 2.0 disk.



**Great Plains Computer Company, Inc.**

P.O. Box 916, Idaho Falls, Idaho 83401

208-529-3210

### PERIPHERAL TECHNOLOGY

We offer a complete selection of Floppy Disc Controller Cards for the S-50 Buss.

**FD-1:** For use with SWTPC 6800 & 6809. Runs TSC FLEX 2.0 without modification. FULLY ASSEMBLED AND TESTED: \$100.00

**FD-1B:** Bare board + documentation ONLY \$ 27.00

### COMPLETE FLOPPY DISK SYSTEM

Controller board, power supply, cabinet, dual disc drive  
\$775

### ALSO:

Our VDG-1 Series Color Graphics Board can perform almost any graphics function.

**VDG-1:** 10 modes of operation Up to 8 colors available. 32 x 16 alphanumerics to 256 x 192 graphics. 6K RAM installed on board. ASSEMBLED AND TESTED: \$225.00

With only 1K RAM installed. Additional RAM may be installed in future: \$135.00

### INFORMATION AVAILABLE FROM:

PERIPHERAL TECHNOLOGY  
290 Lamplighter Lane  
Marietta, Ga. 30067

TERMS: COD CHECK MONEY ORDER

## '68' MICRO JOURNAL

- ★ The only ALL 6800 Computer Magazine.
- ★ More 6800 material than all the others combined:

### MAGAZINE COMPARISON (2 years)

Monthly Averages  
6800 Articles

KB	BYTE	CC	DOBB'S	TOTAL PAGES
7.8	6.4	2.7	2.2	19.1 ea. mo.

Average cost for all four each month: \$5.88  
(Based on advertised 1-year subscription price)

'68' cost per month: \$1.21

That's Right! Much, Much More

for About

1/5 the Cost!

1-Year \$18.50 2-Year \$32.50 3-Year \$48.50

OK, PLEASE ENTER MY SUBSCRIPTION

Bill My: Master Charge ☐ — VISA ☐

Card # \_\_\_\_\_ Exp. Date \_\_\_\_\_

For ☐ 1-Year ☐ 2 Years ☐ 3 Years

Enclosed: \$ \_\_\_\_\_

Name \_\_\_\_\_

Street \_\_\_\_\_

City \_\_\_\_\_ State \_\_\_\_\_ Zip \_\_\_\_\_

My Computer Is: \_\_\_\_\_

### 68 MICRO JOURNAL

3018 Hamill Road

HIXSON, TN 37343

Foreign surface add \$9.50 per year.  
Foreign Air Mail add \$29.00 per year.



Life Subscription \$250.00

Note: Canada & Mexico ADD \$4.50 per year.  
New subscriptions require 6-8 weeks processing time.

# ATTENTION!

HOBBYISTS, EXECUTIVES, INVENTORS, ENGINEERS,  
PROGRAMMERS, SMALL BUSINESSMEN

LOOK AT WHAT IS AVAILABLE FROM STOCK  
**FROM THOMAS INSTRUMENTATION!**

OUR NINTH YEAR IN BUSINESS

## FEATURING

\* \* \* \* \* **NEW 16K (4-4K) MEMORY** \* \* \* \* \*

SS-50

SS-50

\*A "Cents"able way to add memory to your system

\*Four 4K blocks individually addressable 0-F

\*Additional memory at less than \$10.00 per 1K

\*Add memory 1K at a time, using low cost 2114's

\*The Memory Card is available three ways

- Asm. & tested, socketed with all 16K **\$295.00**
- Asm. & tested, socketed for 16K, with 1K **\$129.00**
- Bare card and Documentation **\$ 44.00**

### \* \* SPECIAL: \$242.00 VALUE FOR ONLY \$175.00 \* \*

- A set of our bare cards to build a small system
- Consists of 8-Slot Backplane/Motherboard,
- Super CPU, Video Ram, 16K Memory, 10 Port
- Parallel I/O, Wire Wrap Prototype Card, and
- Documentation for each of the above

### \* \* OUR SS-50 LINE-UP \* \*

- All Thomas Instrumentation's assembled cards are burned in at 150°F and fully tested
- All cards come with full documentation including software source listings where appropriate
- Bare card price does not include edge connectors
  - Super CPU asm. with monitor source but without 2K-2708's EPROM monitor **\$195.00**
  - Monitor in two 2708's EPROMS **\$ 29.00**
  - CPU bare card, doc., & source **\$ 49.00**
  - Video ram asm. 7X9 char. 64X16 line **\$169.00**
  - Video ram bare card, doc., & source **\$ 45.00**
  - Parallel I/O asm. 100 I/O lines includes 5 PIAs for 10 ports **\$110.00**
  - Parallel I/O bare card & doc. **\$ 35.00**
  - Wire-Wrap/Prototype bare card **\$ 29.00**

### \* \* NEW PRODUCT LINES \* \*

- NEW RCA sealed Keyboards
  - Model 611 **\$ 85.00**
  - Model 601 **\$ 65.00**
  - CPU Cable **\$ 10.00**
  - Leedex Monitor **\$139.00**

### \* \* NEW BACKPLANES/MOTHERBOARDS \* \*

- The following cards are extra thick (3/32)
  - 16 Position SS-50 **\$80.00**
  - 12 Position SS-50 **\$60.00**
  - 8 Position SS-50 **\$40.00**
  - 4 Position SS-50 **\$20.00**
  - 8 Position SS-30 **\$39.00**
- SS-50 to SS-30 Transition card will be available next month
- Connectors for the above cards are separate, SS-50 take 5 for each pos., SS-30 take 3 each backplanes take males, main cards take females
  - Males Tin \$0.40ea. Gold \$1.60ea.
  - Females Tin \$0.50ea. Gold \$1.60ea.

**WE  
DESIGN  
HARDWARE**

**DEALERS FOR SWTPC, GIMIX, AND TSC**

THOMAS INSTRUMENTATION SPECIALIZES IN HELPING YOU  
DEVELOP LOW COST SYSTEMS TO MEET YOUR INDIVIDUAL  
COMPUTING NEEDS . . . LET US AUTOMATE YOUR LABORATORY  
WE HAVE SPECIAL SYSTEMS AND PRICES FOR SCHOOLS

**WE  
WRITE  
SOFTWARE**

**THOMAS INSTRUMENTATION**

**168 EIGHTH STREET AVALON, N.J. 08202 (609) 967-4280**

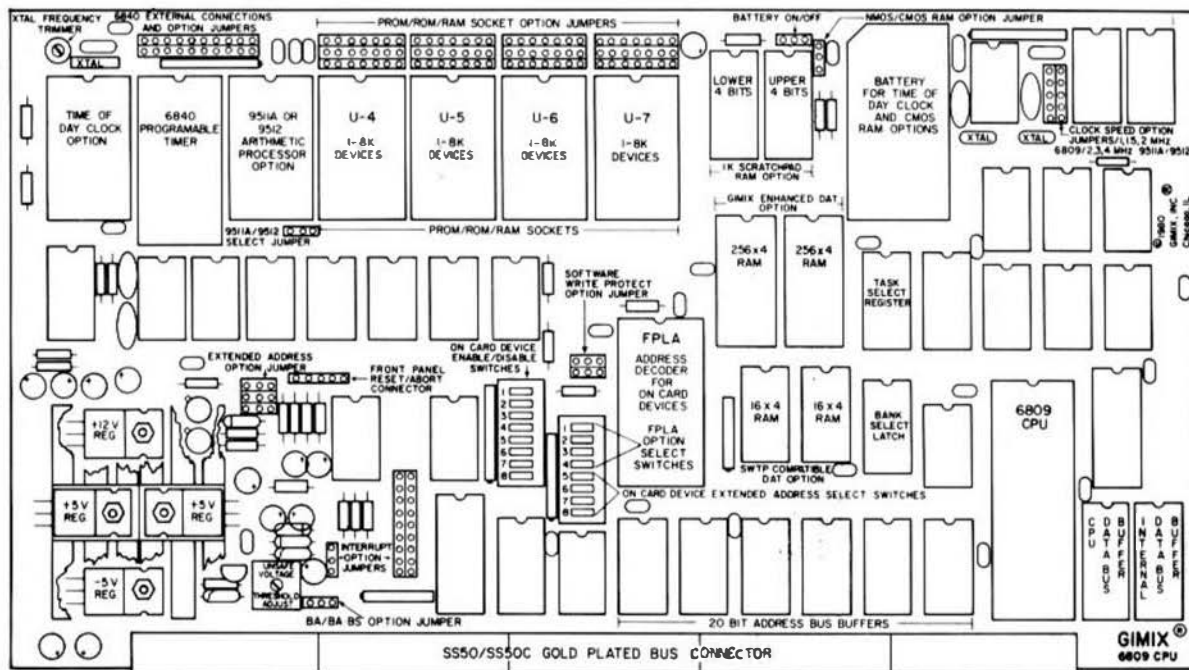
N.J. RES. INCLUDE 5% SALES TAX

CONTINENTAL U.S.A. INCLUDE \$2.00 SHIPPING, CANADA \$5.00, FOREIGN \$10.00





# GIMIX PROUDLY PRESENTS!!!



GIMIX 6809+ FUNCTION LAYOUT

## SS50C 6809 CPU

The 6809 CPU card will be available in a standard version and our **6809 PLUS** version that is fully socketed to allow adding options at anytime.

- + A 6840 timer package that provides 3 independent 16 bit counters is included on all **6809 PLUS** cards.
- + A 9511 or 9512 Arithmetic Processors option with its own independent crystal that allows you to use 2, 3, or 4 MHz parts in any combination with the 6809 running at 1, 1.5, or 2 MHZ.
- + 1K of scratchpad RAM
- + A Time of Day Clock option with battery back-up. With this option you can also substitute 1K of CMOS RAM that will also be battery backed up.
- + User selectable processor speeds without having to change the crystal.

32K of PROM, ROM or RAM. Both versions have 4 sockets that can each hold from 1K to 8K parts. Single or multiple voltage parts can be used on the **PLUS** version. The standard version only allows the use of single voltage parts.

All on board devices and options can use extended addressing so that they will only respond to that page to which they are set.

The card is double buffered and allows versatility in the use of software and memory address control disciplines. Please note that this card does not have an on board baud rate generator, and must be used in systems where baud rates (if needed) are provided elsewhere in the system.

**GIMIX** inc.

1337 WEST 37th PLACE • CHICAGO, IL 60609 • (312) 927-5510 • TWX 910-221-4055

GIMIX® and GHOST® are registered trademarks of GIMIX inc.

1980 GIMIX Inc.



# SS-50 MEETS UCSD PASCAL

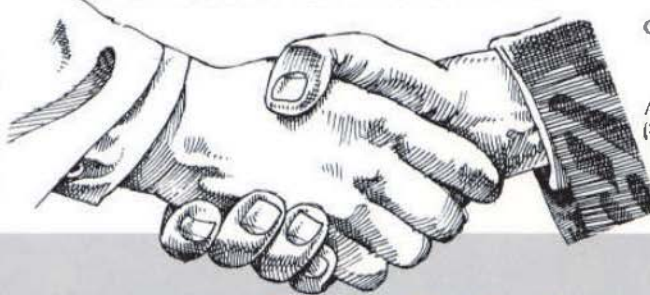
## FOR 6809 SYSTEMS

IMMEDIATE DELIVERY FOR SWTPC, GIMIX USERS, 8" OR 5¼" DISKETTES  
SMOKE SIGNAL, BROADCASTING USERS, INQUIRE

FREE! UCSD PASCAL USERS MANUAL PLUS  
SWTPC IMPLEMENTATION NOTES WITH CSI-1

CSI-1 Operating Systems, PASCAL  
Compiler, Screen Editor, Filer,  
Linker, Library, Setup, Binder,  
Interpreter, BIOS ..... \$250.00

CSI-2 BASIC Compiler, YALOE (Line  
editor for hard-copy terminals),  
Patch, Disassembler, Calcu-  
lator ..... \$100.00



CSI-3 MACRO Assemblers for 6809,  
6800 and other Micro-  
processors ..... \$100.00

ALL THREE DISKS AND MANUAL  
(SYSTEM) ..... \$419.00

## UCSD PASCAL™ MEETS BUSINESS

### NEW MICRO-WINCHESTER DISK DRIVE FOR MICROCOMPUTERS

CSI announces the availability of the new micro-winchester hard disk drive as an option for their UDS 470 microcomputer. The micro-winchester drive replaces one of the two mini-floppy drives standard with the 470 system, thus bringing a dramatic increase in on-line storage capacity.

This increased storage — 6.38 Megabytes — makes the UDS 470 viable for business applications requiring more on-line storage than previously available with floppy disk drives.

**CALL TOLL-FREE (800) 255-4411**

Continental U.S.A. only. (Kansas residents call (913) 371-6136)

Now Available! Pascal user-group compatible (IBM  
3740) Disk Driver Routines ..... \$20  
(Previous customer only)



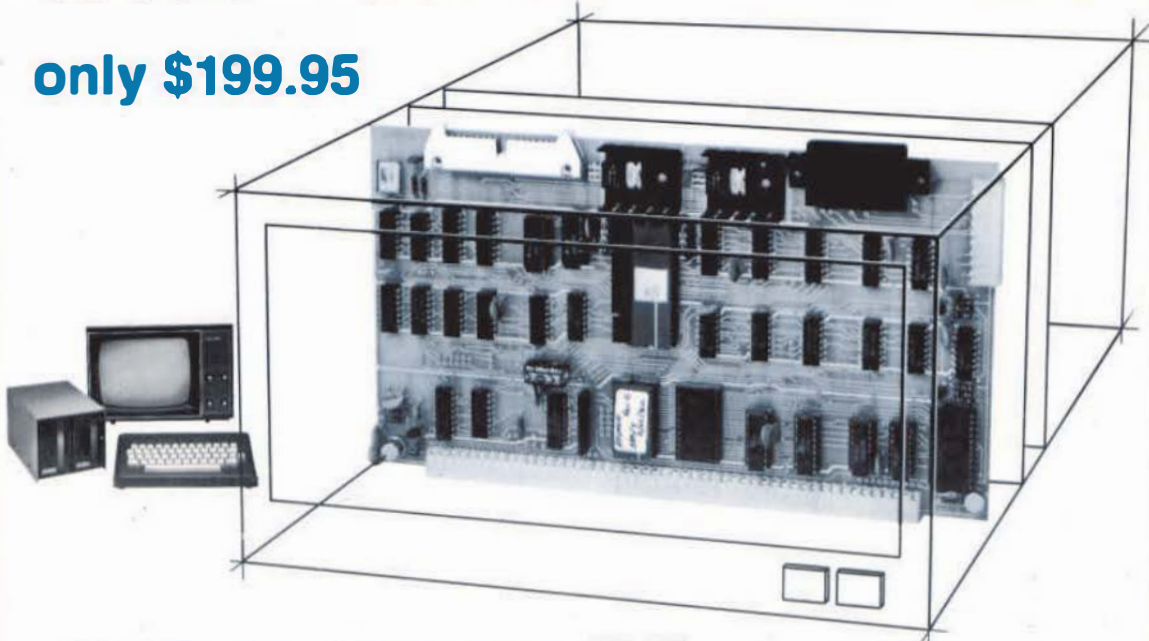
for  
software  
only

1317 Central, Kansas City, KS 66102 (913) 371-6136 • 5200 West 73rd St., Minneapolis, MN 55435 (612) 831-0214  
Drawer EE, Williamsburg, VA 23185 (804) 564-9350

"UCSD Pascal" is a registered trademark of The Regents of the University of California.

# 6800 PROCESSING POWER!

only \$199.95



## The Percom SBC/9™: A "10" By Any Measure.

Available with either the new, powerful 6809  $\mu$ P or an optional 6800-software-compatible 6802, here are 10 beautiful reasons why the Percom SBC/9™ is not just another runner-up MPU/Single-Board-Computer card.

- 1 SS-50 bus direct, plug-in-compatible upgrade MPU. Requires no modification of the system bus, I/O or memory.
- 2 Full-capability stand-alone single-board computer. Accommodates a 6809 microprocessor or optional 6802 microprocessor **without modification**.
- 3 On-card 1 K ROM monitor "auto-links" to optional second 1 K PROM — if installed. Second PROM may be used to easily extend or modify the primary monitor command set.
- 4 Eight-bit parallel port is multi-address extension of system bus. Accommodates an exceptional variety of peripheral devices ranging from game paddles and keyboards to memory management modules. Connector is optional.
- 5 Serial port includes a full-range selectable bit rate generator. Optional subminiature 'D' connector provides RS-232 compatibility.
- 6 Extendable addressing via SS-50 bus baud lines to 1 Mbyte. Extendable addressing to 16 Mbytes or more through the parallel "super port."
- 7 Includes 1 Kbyte of static RAM.
- 8 All on-card I/O is fully decoded so that adjacent memory space may be used.
- 9 ROM circuit may be jumper-wired for single- or triple-voltage 2716 EPROM.
- 10 On-card power regulators simplify power supply design by minimizing regulation demands.

Plug the SBC/9™ into your SS-50 system bus, and just that easily you've upgraded to the new super-fast super-powerful 6809 MPU with such programming amenities as 10 addressing modes, 16-bit instructions, auto-increment/auto-decrement and position-independent code. Plus, you now have extended addressing capability, and operation under control of PSYMON™, the most powerful and flexible 1K ROM 6809 operating system yet written.

**Percom System MONitor**  
PSYMON™ provides the usual ROM monitor functions in 1 Kbyte. It is easily extended and customized because its unique "look-ahead" program structure first searches an alternate command table. The table, if present, may be used to redefine or extend PSYMON's™ command set.

And with PSYMON™, I/O is easily directed to any peripheral device — even a disk system — through a Device Control Block table located

in memory. This allows you to leave the details of I/O software to the separate I/O device drivers.

A PSYMON™ ROM is included free with the purchase of an SBC/9™. The Users Manual includes a source listing.

The 1 Kbyte ROM monitor for the SBC/9™ 6802 option includes a primary set of typical 6800-compatible monitor commands. As for PSYMON™, the commands are easily extended or modified.

Products are available at Percom dealers nationwide. Call toll-free, 1-800-527-1592, for the address of your nearest dealer, or to order direct. Prices and specifications subject to change without notice.

™ Trademark of Percom Data Company, Inc.

PERCOM DATA COMPANY, INC.  
211 W. KIRBY GARLAND, TEXAS 75042  
(214) 272-3421

**PERCOM**